

HP xw4300 Workstation

Service and Technical Reference Guide

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Contents

Preface

P.1 Important Safety Warnings	8
P.2 Updating BIOS, Drivers, and Software	10
P.3 Finding Information	10
P.3.1 E-Support.	10
P.3.2 Additional Documentation	10
P.3.3 Helpful Links	10
P.3.4 Using the Documentation Library and Diagnostics CD	10
P.3.5 Locating Regulatory Information	11
P.3.6 Parts and Accessories	11
P.3.7 Subscriber's Choice	11

1 Product Overview

1.1 Product Features	14
1.1.1 Exploded View	14
1.1.2 Front Panel Components	15
1.1.3 Rear Panel Components	16
1.2 Serial Number and COA Label Location.	17
1.3 Product Specifications	17
1.4 Power Supply and Cooling	18
1.4.1 Power Output and Cooling	18
1.4.2 Power Supply Specifications	18
1.4.3 Power Consumption and Cooling.	19
1.4.4 System Fans and Airflow.	19
1.4.5 Resetting the Power Supply	19
1.5 Environmental Specifications	20
1.6 ENERGY STAR	21
1.6.1 ENERGY STAR Compliance.	21
1.7 Hyper-Threading Technology	22
1.8 Dual-Core CPUs	22
1.9 HP Cool Tools	22

2 Installing or Restoring the Operating System

2.1 Installing the Operating System and Software	24
2.1.1 Microsoft Windows XP Professional	24
2.1.2 Installing or Upgrading Device Drivers	24
2.1.3 Linux-Preinstalled Workstations	24
2.1.4 Linux-Enabled Workstations.	26
2.2 HP Software	26
2.3 Restoring the Operating System.	26
2.4 Protecting the Software.	27
2.5 Ordering Backup Software	27

3 System Management

3.1 Computer Setup (F10)	30
3.1.1 BIOS ROM	30
3.1.2 Using Computer Setup (F10)	31
3.1.3 Computer Setup Menu	31
3.2 Desktop Management	37
3.2.1 Initial Configuration and Deployment	37
3.2.2 Remote System Installation.	37
3.2.3 Software Updating and Management.	37

3.2.4 ROM Flash	39
3.2.5 Asset Tracking and Security	42
3.2.6 Fault Notification and Recovery	47
4 Removal and Replacement Procedures	
4.1 Service Considerations	50
4.1.1 Cautions, Warnings, and Safety Precautions	50
4.1.2 Electrostatic Discharge Information	50
4.1.3 Tools and Software Requirements	51
4.1.4 Special Handling of Components	52
4.2 Pre-Disassembly Procedures	54
4.3 System Board	55
4.3.1 System Board Components	55
4.3.2 System Board Architecture	56
4.4 Steps for Removal and Replacement of Components	57
4.5 Disassembly Order	57
4.6 Security Lock (Optional)	58
4.7 Cable Lock (Optional)	58
4.8 Universal Chassis Clamp Lock (Optional)	59
4.9 Access Panel	60
4.10 Hood Sensor	60
4.11 Solenoid Hood (Smart Cover) Lock (Optional)	61
4.12 Front Bezel	61
4.13 Bezel Blanks	62
4.14 Front Panel I/O Device Assembly	63
4.15 Power Button	64
4.16 System Speaker	64
4.17 Power Supply	65
4.18 System Fan	66
4.19 Memory	67
4.19.1 Memory Module Features	67
4.19.2 Memory Module Requirements	67
4.19.3 Required Loading Order	68
4.20 Peripheral Component Interconnect (PCI) Slots	69
4.20.1 PCI Slot Types	69
4.20.2 PCI Card Support	70
4.20.3 PCI Express	71
4.20.4 PCI	73
4.20.5 IEEE-1394 (Optional)	74
4.21 Front Fan (Optional)	75
4.22 Battery	76
4.23 Power Connections	77
4.24 Optical Drive (Minitower Position)	78
4.25 Optical Drive (Desktop Position)	80
4.26 Diskette Drive	82
4.27 SCSI Hard Disk Drive	83
4.28 SATA Hard Drive	85
4.28.1 Installing Hard Drives in the Optical Drive Bay (Optional)	87
4.29 CPU Heatsink	88
4.30 Processor	90
4.31 System Board	92
5 System Diagnostics and Troubleshooting	
5.1 Help & Support Center (HSC) and E-Support	94
5.2 Troubleshooting Checklist	94
5.3 LED Color Definitions	94
5.4 HP Insight Diagnostics Offline Edition	95
5.4.1 Key Features and Benefits	95
5.4.2 Theory of Operation	95

5.4.3 Diagnostic Utility on CD	95
5.4.4 Download the ISO Image	96
5.4.5 User Interface	96
5.5 Troubleshooting Using HP Intelligent Manageability Features	99
5.6 Diagnostic Light Codes.	99
5.7 Troubleshooting Scenarios and Solutions	101
5.7.1 Solving Minor Problems	101
5.7.2 Solving Power Supply Problems	103
5.7.3 Solving Diskette Problems	104
5.7.4 Solving Hard Drive Problems	106
5.7.5 Solving Display Problems	107
5.7.6 Solving Audio Problems	109
5.7.7 Solving Printer Problems	110
5.7.8 Solving Keyboard and Mouse Problems	111
5.7.9 Solving Front Panel Component Problems	112
5.7.10 Solving Hardware Installation Problems	113
5.7.11 Solving Network Problems	114
5.7.12 Solving Memory Problems	116
5.7.13 Solving Processor Problems	117
5.7.14 Solving CD-ROM and DVD Problems	118
5.7.15 Solving Internet Access Problems	119
5.8 Power On Self Test (POST) and Error Messages	120
A SATA Devices	
A.1 SATA Guidelines.	126
A.2 SATA RAID Configurations	126
B SCSI Devices	
B.1 SCSI Guidelines	128
B.2 Using SCSISelect with SCSI Devices.	128
B.3 SMART.	128
B.4 Jumpers	129
C Connector Pins	
C.1 Enhanced Keyboard	132
C.2 Mouse	132
C.3 Ethernet RJ-45	132
C.4 Serial Interface	132
C.5 USB.	132
C.6 IEEE 1394	133
C.7 Microphone	133
C.8 Headphone	133
C.9 Line-in Audio	133
C.10 Line-out Audio.	133
C.11 Ultra SCSI	134
C.12 SATA.	135
C.13 Monitor (VGA)	135
C.14 Monitor (DVI)	136
C.15 ATA/ATAPI (IDE) Standard Drive Cable.	137
C.16 24-Pin Power (Main)	137
C.17 4-Pin Power (for Processors)	137
D System Board Designators	
E Power Cord Set Requirements	
E.1 General Requirements	141
E.1.1 Japanese Power Cord Requirements	141
E.1.2 Country-Specific Requirements	141

F Routine Care	
F.1 General Cleaning Safety Precautions	144
F.2 Maximizing the Airflow	144
F.3 Cleaning the Workstation Case	144
F.4 Cleaning the Keyboard	144
F.5 Cleaning the Monitor	144
F.6 Cleaning the Mouse	145
G Additional Password Security and Resetting CMOS	
G.1 Resetting the Password Jumper	148
G.2 Clearing and Resetting the CMOS	148
G.2.1 Using Computer Setup to Reset CMOS	148
G.2.2 Using the CMOS Button	148
H Quick Troubleshooting Flows	
H.1 Initial Troubleshooting	152
H.2 No Power	153
H.2.1 No Power, Part 1	153
H.2.2 No Power, Part 2	154
H.2.3 No Power, Part 3	155
H.3 No Video.	156
H.3.1 No Video, Part 1	156
H.3.2 No Video, Part 2	157
H.3.3 No Video, Part 3	158
H.4 Error Messages	159
H.4.1 Error Messages, Part 1	159
H.4.2 Error Messages, Part 2	160
H.4.3 Error Messages, Part 3	161
H.5 No OS Loading	162
H.6 No OS Loading from Hard Drive	163
H.6.1 No OS Loading from Hard Drive, Part 1	163
H.6.2 No OS Loading from Hard Drive, Part 2	164
H.6.3 No OS Loading from Hard Drive, Part 3	165
H.7 No OS Loading from Diskette Drive.	166
H.8 No OS Loading from CD-ROM Drive.	167
H.9 No OS Loading from Network	168
H.10 Non-functioning Device	169
Index	171

Preface

This preface contains the following information:

- Section P.1 “Important Safety Warnings”
- Section P.2 “Updating BIOS, Drivers, and Software”
- Section P.3 “Finding Information”

P.1 Important Safety Warnings

- ⚠ **WARNING!** *Avoiding Electrical Shocks.* To avoid electrical shock, do not open the power supply. There are no user-serviceable parts inside.

To avoid electrical shock and harm to your eyes by laser light, do not open the DVD laser module. The laser module should be serviced by service personnel only. Do not attempt to make any adjustment to the laser unit. Refer to the label on the DVD for power requirements and wavelength. This product is a class I laser product.

- ⚠ **WARNING!** *Grounding your Equipment.* For your safety, always connect the equipment to a grounded wall outlet. Always use a power cord with a properly grounded plug, such as the one provided with the equipment, or one in compliance with your national safety standards. This equipment can be disconnected from the power by removing the power cord from the power outlet. This means the equipment must be located close to an easily accessible power outlet.
-

- ⚠ **WARNING!** *Protecting your Ears.* If your system is a multimedia model, or if you have installed a sound card in your system, always turn the volume down before connecting the headphones or speakers. This prevents discomfort from unexpected noise or static. Listening to loud sounds for prolonged periods of time may permanently damage your hearing. Before putting on headphones, place them around your neck and turn the volume down. When you put on the headphones, slowly increase the volume until you find a comfortable listening level. When you can hear comfortably and clearly, without distortion, leave the volume in that position.
-

- ⚠ **WARNING!** *Removing and Replacing the Cover.* For your safety, never remove the system side cover without first disconnecting the power cord from the power outlet and removing any connection to a telecommunications network. If a Power Protection Device is fitted to your system, you must shut down your computer using its on/off switch, then remove the power cord before removing the system's side cover. Remove the Power Protection Device cables before any servicing operation. Always replace the side cover before switching the system on again.
-

- ⚠ **WARNING!** *Getting Battery Safety Information.* There is a danger of explosion if the battery is incorrectly installed. For your safety, never attempt to recharge, disassemble, or burn an old battery. Replace the battery with the same or equivalent type, as recommended by the manufacturer.

The battery in this system is a lithium battery that does not contain any heavy metals. However, to protect the environment, do not dispose of batteries in household waste. Return used batteries either to the shop from which you bought them, to the dealer from whom you purchased your system, or to HP so that they can either be recycled or disposed of in the correct way. Returned batteries will be accepted free of charge.

- ⚠ **WARNING!** *Avoiding Metallic Particulates.* They can be especially harmful around electronic equipment. This type of contamination may enter the data center environment from a variety of sources, including, but not limited to, raised floor tiles, worn air conditioning parts, heating ducts, rotor brushes in vacuum cleaners, or printer component wear. Because metallic particulates conduct electricity, they have an increased potential for creating short circuits in electronic equipment. This problem is exaggerated by the increasingly dense circuitry of any electronic equipment.

Over time, very fine whiskers of pure metal can form on electroplated zinc, cadmium, or tin surfaces. If these whiskers are disturbed, they might break off and become airborne, possibly causing failures or operational interruptions. For over 50 years, the electronics industry has been aware of the relatively rare, but possible, threat posed by metallic particulate contamination. During recent years, a growing concern has developed in computer rooms where these conductive contaminants are formed on the bottom of some raised floor tiles.

Although this problem is relatively rare, it might be an issue within your computer room. Since metallic contamination can cause permanent or intermittent failures on your electronic equipment, Hewlett-Packard strongly recommends that your site be evaluated for metallic particulate contamination before installation of electronic equipment.

- ⚠ **WARNING!** *Avoiding Burn Injuries.* Some parts inside the computer will be hot. Turn off and unplug the system, then wait approximately three to five minutes for it to cool down before opening the system access panels or touching internal components.
-

⚠ **WARNING!** *Avoiding Electrical Problems with Phone Lines.* If you have a modem:

Do not attempt to connect this product to the phone line during a lightning storm. Never install telephone jacks in wet locations unless the telephone line has been disconnected at the network interface. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Use caution when installing or modifying telephone lines. Avoid using a telephone (other than a cordless type) during an lightning storm. There may be a risk from lightning.

Do not use the telephone to report a gas leak in the vicinity of the leak.

Never touch or remove the communications board without first removing the connection to the telephone network.

⚠ **CAUTION:** *Avoiding Static Electricity.* Static electricity can damage electronic components. Turn OFF all equipment and disconnect the power cable before installing an accessory card. Do not let your clothes touch any accessory card. Handle the card as little as possible and with care.

⚠ **CAUTION:** *Getting Information on Ergonomic Issues.* It is strongly recommended that you read the ergonomics information in the *Safety and Comfort Guide* on the *Documentation Library and Diagnostics* CD before using your system. You can access more extensive ergonomics information at <http://www.hp.com/ergo>.

📄 **NOTE:** *Recycling Your System.* HP has a strong commitment toward the environment. Your HP system has been designed to respect the environment as much as possible. HP can also take back your old system for recycling when it reaches the end of its useful life. HP has a product take-back program in several countries. The collected equipment is sent to an HP recycling facilities in Europe or the U.S.A. As many parts as possible are reused. The remainder is recycled. Special care is taken for batteries and other potential toxic substances, these are reduced into non-harmful components through special chemical processes. If you require more details about the HP product take-back program, contact your local dealer or visit <http://www.hp.com/hpinfo/globalcitizenship/environment/recycle/>.

P.2 Updating BIOS, Drivers, and Software

HP continually strives to implement new enhancements that will increase functionality, performance, and reliability of your HP Workstation. To ensure that your system takes advantage of the latest enhancements, HP recommends that you install the latest BIOS, driver, and software updates on a regular basis.

To download available updates, choose one of the following options:

- If you have the Help & Support Center installed on your system (most factory-installed Windows XP operating systems do), click **Start > Help & Support Center**. Click the icon above **HP Software & Drivers Download** and review or select available updates.
- Visit the HP Support Web site:
 - a. Go to <http://www.hp.com/go/workstationsupport>.
 - b. Select your HP Workstation from the list.
 - c. In the "I would like to" section, click **download drivers and software**.
 - d. In the "select operating system" section, select your OS.
 - e. Locate the BIOS, driver, or software and click **download** next to your desired file. Follow the on-screen instructions to complete installation.

P.3 Finding Information

P.3.1 E-Support

For online access to technical support information and tools, go to <http://www.hp.com/support>. Support resources include Web-based troubleshooting tools, technical knowledge databases, driver and patch downloads, online communities, and proactive notification services.

The following sites are also available to you.

- <http://www.hp.com>—Provides useful product information.
- http://www.hp.com/support/workstation_manuals—Provides the latest online documentation.
- <http://www.hp.com/support>—Provides a listing of the worldwide technical support phone numbers. Access this list by visiting the site, selecting your region and clicking Contact HP in the upper-left corner.

P.3.2 Additional Documentation

Refer to the *Documentation Library and Diagnostics* CD for additional product information in PDF format. The CD contains the following:

- *Setup and Troubleshooting* guide (available in print and PDF on library CD)—Helps you set up hardware and factory-provided software; also includes basic troubleshooting information should you encounter any problems during initial startup.
- *Safety and Comfort Guide* (PDF on library CD)—Provides safety and ergonomic information to assist you in setting up a safe and comfortable workstation environment.
- *Safety & Regulatory Information* guide (PDF on library CD)—Provides safety and regulatory information that ensures compliance with U.S., Canadian, and various international regulations.

P.3.3 Helpful Links

The following links can also be accessed for additional information:

- Product Bulletin—The product bulletin contains the QuickSpecs and is available at: <http://h18000.www1.hp.com/products/quickspecs/productbulletin.html>
- For information about the Microsoft® Windows® operating system: <http://www.microsoft.com>
- For information about the Linux operating system: <http://www.redhat.com>
- Additional product information is available from the HP Web site at <http://www.hp.com/go/workstations>.

P.3.4 Using the *Documentation Library and Diagnostics* CD

To access the contents of the *Documentation Library and Diagnostics* CD, follow the steps that are applicable to your workstation.

Windows-Based Workstations

Insert the CD into the CD-ROM drive. The CD Autorun feature begins.

If there is no CD-ROM drive activity for two minutes or more, the Autorun feature might not be enabled on the workstation. To run the CD:

1. Click **Start > Run**.
2. In the text box, enter:
X:\index.htm
(where X is the drive letter designator for the CD-ROM drive)
3. Click **OK**.

Linux-Based Workstations

If the workstation is running a Linux operating system, browse the CD and click the **index.htm** file to launch the CD interface. To view the documents on the CD, download and install Adobe® Acrobat® Reader for Linux from <http://www.adobe.com>.

P.3.5 Locating Regulatory Information

Refer to the *Safety & Regulatory Information* guide on the *Documentation Library and Diagnostics* CD for product class information. You can also refer to the label on the rear of the chassis.

P.3.6 Parts and Accessories

For complete and current information on supported accessories and components, visit <http://partsurfer.hp.com>.

P.3.7 Subscriber's Choice

Subscriber's Choice, an HP program, enables you to sign up to receive driver and software alerts, proactive change notifications (PCNs), the HP newsletter, and more. Sign up today at <http://www.hp.com/go/subscriberschoice>.

1 Product Overview

This chapter presents an overview of the hardware components:

- Section 1.1 "Product Features"
- Section 1.2 "Serial Number and COA Label Location"
- Section 1.3 "Product Specifications"
- Section 1.4 "Power Supply and Cooling"
- Section 1.5 "Environmental Specifications"
- Section 1.6 "ENERGY STAR"
- Section 1.7 "Hyper-Threading Technology"

For a detailed overview of all hardware components and spare part numbers, visit <http://partsurfer.hp.com>.

1.1 Product Features

This section contains the following information:

- Section 1.1.1 “Exploded View”
- Section 1.1.2 “Front Panel Components”
- Section 1.1.3 “Rear Panel Components”

1.1.1 Exploded View

The following illustration shows a typical HP xw4300 Workstation (drive configurations can vary).
For complete information on supported accessories and components, visit <http://partsurfer.hp.com>.

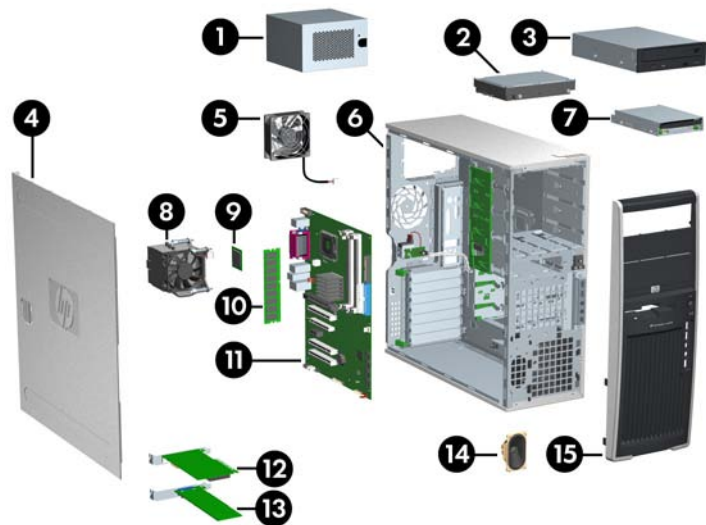


Table 1-1 Exploded View

❶	Power Supply	❸	Chassis	❹	System Board
❷	Hard Drive	❺	Diskette Drive	❻	PCI Express Card
❸	Optical Drive*	❻	CPU Heatsink	❼	PCI Card
❹	Access Panel	❼	Processor	❽	Speaker
❺	System Fan	❽	Memory Module	❾	Front Bezel

*An optical drive is a CD-ROM, CD-RW, CD-RW/DVD-ROM, or DVD±RW combo drive.

1.1.2 Front Panel Components

The following illustration shows a typical HP xw4300 Workstation. Drive configurations can vary.

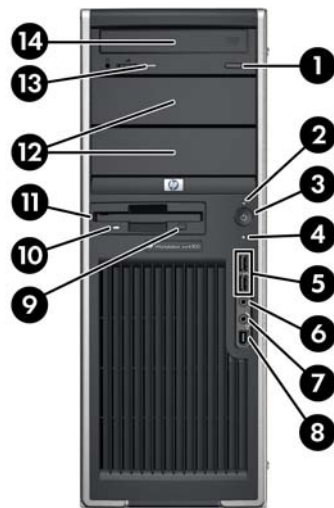


Table 1-2 Front Panel View

1	Optical Drive Eject Button	6	Headphone Connector	11	Diskette Drive
2	Power On Light	7	Microphone Connector	12	5.25-Inch Drive Bays (x2)*
3	Power Button	8	IEEE-1394 Connector**	13	Optical Drive Activity Light
4	Hard Drive Activity Light	9	Diskette Drive Eject Button***	14	Optical Drive*
5	Universal Serial Bus 2.0 (USB) (x2)	10	Diskette Drive Activity Light***		

*An optical drive is a CD-ROM, CD-RW, CD-RW/DVD-ROM, or DVD±RW combo drive.

**IEEE-1394 is an optional feature. If the workstation was purchased without this option, this connector will be covered.

***Diskette drive is an optional feature.

1.1.3 Rear Panel Components

The following illustration shows a typical HP xw4300 Workstation.

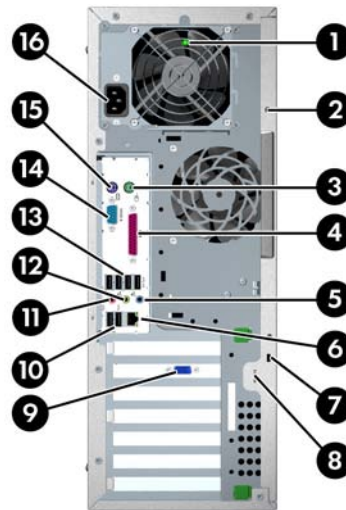


Table 1-3 Rear Panel Components

❶	Power Supply Built-In Self Test (BIST) LED	❹	Graphics Adapter
❷	Universal Chassis Clamp Opening	❺	Universal Serial Bus 2.0 (USB) (x2)
❸	PS/2 Mouse Connector (green)	❻	Microphone Connector (pink)
❹	Parallel Connector (burgundy)	❼	Audio Line-Out Connector (lime)
❺	Audio Line-In Connector (light blue)	❽	Universal Serial Bus 2.0 (USB) (x4)
❻	RJ-45 Network Connector	❿	Serial Connector (teal)
❼	Cable Lock Slot	⓫	PS/2 Keyboard Connector (purple)
❽	Padlock Loop	⓬	Power Cord Connector

NOTE: To assist you in connecting your peripheral devices, the rear panel connectors are labeled and color-coded according to industry standards.

1.2 Serial Number and COA Label Location

Each HP Workstation has two unique serial number labels ❶ and a Certificate of Authentication (COA) label ❷ (for Windows-preinstalled systems only). In general, the serial number labels can be found on the top panel or on the side of the unit and at the rear of the unit. Keep this number available when contacting customer service for assistance. The COA label is generally located on the top panel or side of the unit near the serial number label.



1.3 Product Specifications

The following table lists the physical dimensions of the HP xw4300 Workstation.

Table 1-4 Physical Characteristics

Weight	16 kg/35 lb (typical configuration)
(dependent on configuration)	
Tower Dimensions	45.0 cm (17.7 in) high
	16.8 cm (6.6 in) wide
	45.6 cm (17.9 in) deep

1.4 Power Supply and Cooling

This section contains the following information:

- Section 1.4.1 “Power Output and Cooling”
- Section 1.4.2 “Power Supply Specifications”
- Section 1.4.3 “Power Consumption and Cooling”
- Section 1.4.4 “System Fans and Airflow”
- Section 1.4.5 “Resetting the Power Supply”

1.4.1 Power Output and Cooling

The HP xw4300 Workstation power supply contains seven outputs:

- +3.3V—used with PCI, PCI Express, Audio, CK-410, ICH7R, Super I/O, BIOS ROM, and on-board logic
- +5V—used with storage (disk, optical, 3.5-inch diskette), PCI, PCI Express, ICH7R, Audio, Keyboard/Mouse, USB, input to on-board regulators (1.2V, 1.5V, 1.8V), and on-board logic
- +12V-A—used with PCI, PCI Express, and system fans
- +12V-B—used with storage (disk, optical, 3.5-inch diskette, graphics dongle)
- +12V-CPU—input to on-board regulator that supplies power for CPU
- -12V—used by PCI
- 5VSB—used for sleep circuitry

Table 1-5 Max Current per Rail

Voltage Rail	Maximum Continuous Current
3.3V	15.0V
5V	21.0V
12V-CPU	15.0V
12V-A	10.0V
12V-B	11.0V
V12N	0.3V
5VSB	2.0V

⚠ WARNING! Do not exceed 110W of a 5V and 3.3V power combination.

⚠ WARNING! Do not exceed 31.5A (378W) of 12V (CPU/A/B) power combination.

⚠ WARNING! Do not exceed **460W** of total continuous output power.

1.4.2 Power Supply Specifications

The following table lists the power supply specifications.

Table 1-6 Power Supply Specifications

Full Ranging Input (No Line Select Switch)	Yes
Active Power Factor Correction (APFC) (Input Current is nearly 1/2 a non-APFC PS)	Yes
Passive Power Factor Correction (PFC)	No
Operating Voltage Range	90 to 264VAC/118VAC
Rated Voltage Range	100 to 240VAC
Rated Line Frequency	50 to 60Hz/400Hz
Operating Line Frequency Range	47 to 66Hz/393 to 407Hz
Rated Input Current	7.4A/7.4A
Maximum Rated Power	460W

Table 1-6 Power Supply Specifications

Heat Dissipation	Typical is 733.8btu/hr Maximum is 2415.4btu/hr
Power Supply Fan	92mm variable speed
Power Supply Dimensions	9.76cm (3.843 in) wide 15cm (5.906 in) high 15.371cm (6.052 in) deep
ENERGY STAR Compliant	Available as an option
Built-in Self Test LED	Yes
Surge Tolerant Full Ranging Power Supply	Withstands power surges up to 2000V


1.4.3 Power Consumption and Cooling

The following table shows the power consumption for a typical configuration based on primary power consumptions:

- One processor (1 x 3.6 GHz 2M L2 Pentium 4 Processor with HT Technology)
- One GB memory (2 x 512 MB)
- Two hard drives (2 x SATA 40 GB)
- CD-ROM drive
- PCI Express Graphics Card (NVIDIA FX 1400)
- One diskette
- Monitor (A monitor is attached. The system does not provide power to the monitor.)

Table 1-7 HP xw4300 Workstation Power Consumption and Cooling for Specified Configuration

Input Power Consumption	120VAC/60Hz
Typical operating mode (system busy)	215W/733.8btu/hr
Windows XP Idle	107W/365.2btu/hr
Standby mode (S3)	~4W
Hibernate mode (S4)	~3W or less
Power Off (S5)	~3W or less

 **NOTE:** To reach zero power consumption, either unplug the workstation from the power outlet or use a power strip with a switch. However, removing all power to the workstation might reduce the life of the real-time clock battery.

For more information on power-saving features, refer to your operating system documentation.

1.4.4 System Fans and Airflow

The workstation includes a rear system fan, one processor heatsink fan, one power supply fan, plus an optional front system fan.

1.4.5 Resetting the Power Supply

If an overload triggers the power supply overload protection, all power is immediately cut. To reset the power supply unit:

1. Disconnect the power cord.
2. Determine what caused the overload and fix the problem.
3. Reconnect the power cord and reboot the workstation.

When you power down the workstation through the operating system, power consumption falls below the low power consumption but does not reach zero. This on/off feature extends the life of the power supply.

1.5 Environmental Specifications

The following table describes the environmental specifications.

Table 1-8 Environmental Specifications

Temperature	Operating: 5 to 35°C (40 to 95°F) Non-operating: -40 to 60°C (-40 to 140°F)
Humidity	Operating: 8 to 85%RH, non-condensing Non-operating: 8 to 90%RH, non-condensing
Altitude	Operating: 0 to 10,000 ft (3048m) Non-operating: 0 to 30,000 ft (9144m)
Shock	Operating ½-sine: 40g, 2-3ms Non-operating: ½-sine: 160 cm/s, 2-3ms, (~100g) square: 605 cm/s, 30 G NOTE: The values represent individual shock events and are not indicative of repetitive shock events.
Vibration	Operating Random: 0.5g (rms), 5-300 Hz Non-Operating: random: 2.0 g (rms), 10-500 Hz NOTE: The values are not indicative of continuous vibration.


1.6 ENERGY STAR

The ENERGY STAR® program, a government-backed initiative, promotes energy efficiency by identifying ways to reduce energy consumption. Select HP Workstations participate in the ENERGY STAR program.

 **NOTE:** ENERGY STAR is not supported on Linux-based workstations.

For those workstations purchased with the Energy Star option and have it enabled, the power management features will be set as follows:

- Monitor—goes into sleep mode after 20 minutes of inactivity.
- System—goes into Standby mode after 20 minutes of inactivity.
- Hard Drive—goes into power savings mode after the system goes into Standby mode.

 **NOTE:** If you have to restore the operating system, reset the ENERGY STAR settings (if applicable) after the restore.

To verify the factory default power settings for your product, select **Start > Control Panel** and double-click **Power Options**.


1.6.1 ENERGY STAR Compliance

HP products purchased with the ENERGY STAR configuration are compliant with the U.S. Environmental Protection Agency (EPA) ENERGY STAR Computers Program. The EPA ENERGY STAR configuration does not imply endorsement by the EPA. As an ENERGY STAR Partner, HP has determined that products with the ENERGY STAR configuration meet the ENERGY STAR guidelines for energy efficiency.

The ENERGY STAR Computers Program was created by the EPA to promote energy efficiency and reduce air pollution through more energy-efficient equipment in homes, offices, and factories. HP products achieve this by reducing the power consumption when not being used.

ENERGY STAR on HP Workstations uses ACPI power management. The system can wake as a result of a user action (keyboard or mouse) or from the network or a modem.


The Power Management feature, when used in conjunction with an external ENERGY STAR-compliant monitor, will support the power-down features of the monitor. The Power Management feature allows an external monitor to go into low-power mode when the energy save timeout occurs.

 **CAUTION:** Using the Energy Save Monitor feature with non-ENERGY STAR-compliant monitors might cause video distortion when the Energy Save timeout occurs.

1.7 Hyper-Threading Technology

HT Technology is a high performance technology, developed by Intel®, that allows a single processor to execute multiple threads of instructions simultaneously. HT Technology enables the Intel processor to utilize its execution resources more efficiently, delivering performance increases and improving user productivity. HT Technology is comparable to creating two “virtual” processors. It mimics a second core by giving work to under-utilized execution units. However, if there are no under-utilized execution units to work with, HT Technology does not provide any benefit, so not all system applications benefit from the technology.

To see if HT Technology can benefit you, test your system by turning the feature on.

 **NOTE:** If your processor does not support HT Technology, Hyper-Threading will not be an option in the Computer Setup (F10) menu.

To enable HT Technology:

- The Computer Setup (F10) menu can be used to turn this feature on or off. To enter Computer Setup, during power up, wait for the prompt **F10=setup** to appear on the lower right corner of the screen. After the prompt appears, press the **F10** key to enter F10 setup. At Computer Setup, select **Advanced > Device Options > Hyper-Threading**, then choose whether to enable or disable the HT Technology.

OR

- Click the **HP Cool Tools** icon, select **HP Protect Tools Security Manager**, select **BIOS Configuration**, click the **Advanced** tab, click **Device Options** and enable **Hyper-Threading**.
If the HP Cool Tools icon is not on your desktop, click **Start > All Programs > HP Cool Tools > HP Protect Tools Security Manager**. Within HP Protect Tools Security Manager, select **BIOS Configuration**, click the **Advanced** tab, click **Device Options** and enable **Hyper-Threading**.

 **NOTE:** Red Hat Enterprise Linux WS 3 supports HT Technology. An SMP-capable kernel must be installed on your system before this technology can be utilized. For information on how to do this, refer to the *HP User Manual for Linux* at www.hp.com/support/linux_user_manual.

For more information about the HT Technology, visit the Intel Web site at www.intel.com.

1.8 Dual-Core CPUs

The HP xw4300 Workstation is the first entry-level workstation to offer an optional dual-core processor. Like HT Technology, dual-core processors enable better performance over traditional processors. Dual-core processors contain two dedicated processing engines and memory caches that provide the system with two true processors in a single socket, rather than the two “virtual” processors provided by HT Technology. Dual-core processors can better handle the load of multi-threaded applications (such as rendering an image in Digital Content Creation) and highly multi-tasked environments (such as running several productivity applications while listening to music).

1.9 HP Cool Tools

HP xw4300 Workstation comes preloaded with additional software that is not automatically installed when you first boot your system. Additionally, a number of valuable pre-installed tools on your workstation can enhance your workstation experience. To access or learn more about these applications:

- Open the **HP Cool Tools** folder by selecting **Start > All Programs > HP Cool Tools**.

OR

- Click the **HP Cool Tools** icon on the desktop.

To learn more about these applications, click **HP Cool Tools—Learn More**.

To install or launch the applications, click the appropriate application.

2 Installing or Restoring the Operating System

This chapter describes installing and restoring the operating system.

- Section 2.1 “Installing the Operating System and Software”
- Section 2.2 “HP Software”
- Section 2.3 “Restoring the Operating System”
- Section 2.4 “Protecting the Software”
- Section 2.5 “Ordering Backup Software”

If the workstation was shipped with a preinstalled OS, it is configured automatically the first time the workstation is turned on.

△ **CAUTION:** Adding optional hardware devices to your workstation before the operating system successfully installs can cause errors and prevent the operating system from installing properly.

△ **CAUTION:** After the automatic installation has begun, DO NOT TURN OFF THE WORKSTATION UNTIL THIS PROCESS COMPLETES. Turning off the workstation during the installation process might damage the software that runs the system.

2.1 Installing the Operating System and Software

The following section discusses the operating system and HP software installation procedures.

- Section 2.1.1 “Microsoft Windows XP Professional”
- Section 2.1.2 “Installing or Upgrading Device Drivers”
- Section 2.1.3 “Linux-Preinstalled Workstations”
- Section 2.1.4 “Linux-Enabled Workstations”

2.1.1 Microsoft Windows XP Professional

The first time you turn on your workstation, you are prompted to select a language for the operating system. After selecting the language, read and follow the instructions on the screen to complete the installation of the operating system. This takes approximately 10 minutes, depending on the system hardware configuration. During the process, do not turn off your workstation unless you are directed to do so.

2.1.2 Installing or Upgrading Device Drivers

To install hardware devices, such as a printer, display adapter, or network adapter after the operating system is installed, the operating system needs access to the appropriate software drivers for the devices.

To copy the drivers to your system, perform one of the following actions:

- Copy the drivers from the CD that was supplied with the peripheral device because manufacturers usually send drivers on the CD.
- Go to the Help & Support Center installed on your system (on most factory-installed Windows XP operating systems), click **Start > Help & Support**. Click the icon above **HP Software & Drivers Download** and review or select available updates.
- Visit the HP Support Web site:
 - a. Go to <http://www.hp.com/go/workstationsupport>.
 - b. Select your HP Workstation from the list.
 - c. In the “I would like to” section, click **download drivers and software**.
 - d. In the “select operating system” section, select your OS.
 - e. Locate the driver and click **download** next to your desired file. Follow the on-screen instructions to complete installation.
- Visit the Web site of the manufacturer of the peripheral device if no drivers can be found with the other methods.

Creating a Restore Point

You can use System Restore to undo harmful changes to your computer and restore its settings and performance. System Restore returns your computer to an earlier time (called restore point) without causing you to lose recent work, such as saved documents, email, or history and favorites list.

To create a restore point for Windows XP, select **Start > All Programs > Accessories > System Tools > System Restore** and follow the on-screen instructions.

2.1.3 Linux-Preinstalled Workstations

If you have a Linux-preinstalled HP Workstation, follow the instructions in this section to set up your OS and software.

After the boot process completes, you can view additional HP Linux documentation by opening your Internet browser (the browser is automatically set to use the local HP documentation page as its default). You can also access Linux Web links for Red Hat (Internet access required) by using your Internet browser.




NOTE: For additional information on setting up Linux-preinstalled or Linux-enabled workstations, refer to the *HP User Manual for Linux*, which is located at http://www.hp.com/support/linux_user_manual. For more information about HP and Linux, visit <http://www.hp.com/linux>.

Starting the Linux Operating System


The first time the workstation is booted, the Red Hat First Boot utility displays. This program enables you to enter your password, network, graphics, time, and keyboard settings for your workstation.

△ **CAUTION:** After the automatic installation has begun, DO NOT TURN OFF THE WORKSTATION UNTIL THE PROCESS IS COMPLETE. Turning off the workstation during the installation process might damage the software that runs the workstation or prevent its proper installation.

 **NOTE:** When you enable the YPBind feature in the Network tab of the Linux Setup Tool, you might get a blank screen for 15–30 seconds after you have selected, saved all of your settings, and have exited the utility. This is normal behavior. The boot process continues its execution after the screen returns.

Restoring the Linux Operating System

 **NOTE:** To restore the Linux OS, the HP Driver CD and Red Hat box set are required. To get any new enhancements, download the latest HP Driver CD.

 **NOTE:** Linux does not support mixed drive types for a manufacturing preload. When restoring the operating system, mixed drive types can be handled with the restoring media.

Downloading the Latest HP Driver CD

1. Download the ISO image to a local hard drive from the HP support Web site at <http://www.hp.com/go/workstationsupport>.
 - a. Select your HP Workstation from the list.
 - b. Click **download drivers and software**.
 - c. Select the Linux OS that matches your box set.
 - d. Select the latest version from the Utility Tools section.
 - e. Download and unpack it (`tar zxvf filename.tgz`).
2. Copy the ISO image to CD-R bootable media. On another Linux workstation, use the `cdrecord` utility. Identify the device address for the CD burner (`cdrecord --scanbus`). The default is usually 2, 0, 0.
Example:

```
cdrecord -v -eject dev=2,0,0 CD0_golden.iso
```

Installing with the HP Driver CD

To install with the HP Driver CD:

1. Boot the workstation from the Red Hat box set Binary CD 1.
2. Insert the Linux operating system CDs from the Red Hat box set as prompted.
3. Continue following the prompts until the operating system is successfully installed.
4. Configure the X server to start on reboot.
5. Reboot the workstation.
6. Follow the prompts to set up your system with the Red Hat First Boot utility.
7. When prompted in First Boot to add additional CDs, insert the HP Driver CD into the CD-ROM tray of the workstation.
8. Click **Install** next to “Additional CDs.”
The HP Driver CD window opens.
9. Click **Press to begin install...**
10. When the install is done, you will have two options, “Reboot now...” on the left side and “Press to continue, reboot later...” on the right side. Click **Reboot now...**

Upgrading Device Drivers

If you must upgrade a Linux device driver, visit the HP Workstation support Web site at <http://www.hp.com/go/workstationsupport>.

To install hardware devices, such as a printer, a display adapter, or a network adapter after the operating system is installed, the operating system needs access to the appropriate software drivers for the devices. Device drivers are usually provided on a CD supplied with the peripheral device.

Some existing peripheral devices might not have been shipped with drivers developed for Linux. To locate the most current device drivers:

1. Go to <http://www.hp.com/go/workstationsupport>.
 2. Select your HP Workstation from the list.
 3. Click **download drivers and software**.
 4. Select your Linux OS version.
 5. Scroll down and download the desired driver.
- If no driver is found, visit the Web site of the manufacturer of the peripheral device.

2.1.4 Linux-Enabled Workstations

Linux-enabled HP Workstations require the HP Installer Kit for Linux and the purchase of a Red Hat box set. The Installer Kit includes the HP CDs necessary to complete the installation of all versions of the Red Hat box set that have been verified to work on HP Workstation hardware.

Verifying Hardware Compatibility

To see which Linux versions have been verified to work on HP Workstation hardware:

1. Go to http://www.hp.com/support/workstation_manuals.
2. Select your HP Workstation model.
3. Click the **Hardware Support Matrix for Linux** link.

Installing the Linux Operating System

To install the Linux operating system on your Linux-enabled system:

1. Follow the instructions for “Restoring the Linux Operating System” on page 25 in the previous section.
2. Follow the instructions for “Starting the Linux Operating System” on page 24 in the previous section.

 **NOTE:** For more information on setting up Linux-preinstalled or Linux-enabled HP Workstations, refer to the *HP User Manual for Linux*, which is located at http://www.hp.com/support/linux_user_manual. For more information about HP and Linux, visit <http://www.hp.com/linux>.

Upgrading Device Drivers

If you must install new drivers, go to <http://www.hp.com/go/workstationsupport> or refer to “Upgrading Device Drivers” on page 25 in the previous section for more instructions.

2.2 HP Software

The following HP software is installed the first time the HP Workstation is turned on:

- Computer Setup (F10) Utilities and diagnostic features
- HP Support Software including device drivers
- HP Client Manager Software (available for download from <http://www.hp.com/go/easydeploy>)
- System Software Manager (available for download from <http://www.hp.com/go/ssm>)
- Power Management Setup with Energy Saver features (not supported on Linux)
- Security Management tools
- Software Support Management tools

Certain drivers and utilities are available only in selected languages. You can obtain the latest version of these files, in English and selected other languages, in one of four ways:

- Support Software CD
- HP Web site at <http://www.hp.com>
- *Restore Plus!* CD, which is supplied with Windows-based workstations
- *HP Workstations Red Hat Linux with HP Additions* CD, which is supplied with Linux-based workstations

 **NOTE:** Additional HP software might be required in certain situations.

2.3 Restoring the Operating System

To restore the original Windows operating system and factory-installed software, insert the *Restore Plus!* CD that came with your HP Workstation. Carefully read and follow the instructions provided with the *Restore Plus!* CD.

 **NOTE:** If you restore your system using the *Restore Plus!* CD, some settings, such as your power management settings (such as the Energy Star® settings) will need to be reapplied.

In some scenarios, such as if the system is bootable to Windows, an alternative method is to use the System Restore feature included with Windows XP. To restore Windows to a previous state, select **Start > All Programs > Accessories > System Tools > System Restore** and follow the on-screen instructions.


For more information about restoring the Linux OS or software, see “Restoring the Linux Operating System” on page 25.

2.4 Protecting the Software

To protect software from loss or damage, keep a backup copy of all system software, applications, and related files stored on the hard drive. See the operating system or backup utility documentation for instructions on making backup copies of data files.

2.5 Ordering Backup Software

All software that shipped with the workstation, including the *Restore Plus!* CD, can be ordered from HP as a single set, or you can order the various software packages separately.

 **NOTE:** Before calling HP to order the software, be sure to have the serial number of the workstation available. See [“Serial Number and COA Label Location” on page 17](#).

3 System Management

This section describes the various tools and utilities that allow for the system management of the workstation.

- [Section 3.1 “Computer Setup \(F10\)”](#)
- [Section 3.2 “Desktop Management”](#)

3.1 Computer Setup (F10)

This section contains the following information to help you use Computer Setup.

- Section 3.1.1 “BIOS ROM”
- Section 3.1.2 “Using Computer Setup (F10)”
- Section 3.1.3 “Computer Setup Menu”

The Computer Setup (F10) utilities enable you to:

- Change current settings from the factory default settings and set, view, change, or verify the system configuration, including settings for processor, graphics, memory, audio, storage, communications, and input devices.
- Determine if all of the devices installed on the workstation are recognized by the system and functioning properly.
- Determine information about the operating environment of the workstation.
- Solve system configuration errors detected but not automatically fixed during the Power-On Self-Test (POST).
- Flash system ROM.
- Establish and manage passwords and other security features.
- Establish and manage energy-saving timeouts (not supported for Linux platforms).
- Modify or restore factory default settings.
- Set the system date and time.
- Modify the boot order of bootable devices, such as hard drives, diskette drives, optical drives, or LS-120 drives.
- Enable Quick Boot, which is faster than Full Boot but does not run all of the diagnostic tests run during a Full Boot. You can set your system to:
 - always Quick Boot (default)
 - periodically Full Boot (from every 1 to 30 days)
 - always Full Boot
- Enable or disable Network Server Mode, which enables the workstation to boot the operating system when the power-on password is enabled with or without a keyboard or mouse attached. When attached to the system, the keyboard and mouse remain locked until the power-on password is entered.
- Select POST Messages Enabled or Disabled to change the display status of POST messages. POST Messages Disabled suppresses most POST messages, such as memory count, product name, and other non-error text messages. If a POST error occurs, the error is displayed regardless of the mode selected. To manually switch to POST Messages Enabled during POST, press any key (except **F1** through **F12**).
- Establish an Ownership Tag, the text of which is displayed each time the system is turned on or restarted.
- Enter the Asset Tag or property identification number assigned by your company to this workstation.
- Enable power-on password prompting during system restarts (warm boots) as well as during power-on.
- Secure the integrated I/O functionality, including the serial, USB, or parallel ports, audio, or embedded NIC, so that the I/O functionality cannot be used until they are unsecured.
- Enable or disable removable media boot ability.
- Enable or disable removable media write ability (when supported by hardware).
- Replicate your system setup by saving system configuration information on diskette and restoring it on one or more workstations.
- Execute self-tests on specified SATA hard drives (when supported by the drive).

3.1.1 BIOS ROM

The Basic Input/Output System (BIOS) of the computer is a collection of machine language programs stored as firmware in read-only memory (ROM). The BIOS ROM includes such functions as POST, PCI device initialization, Plug 'n Play (PnP) support, power management activities, and the Setup utility. The firmware contained in the BIOS ROM supports the following systems and specifications:

- Microsoft WHQL
- Alert-On-LAN (AOL) and Wake-On-LAN (WOL)
- ACPI 1.0 and OnNow
- SMBIOS 2.3.5
- PC98/99/00 and NetPC
- PXE boot ROM for the integrated LAN controller
- BIOS Boot Specification 1.01
- Enhanced Disk Drive Specification 3.0
- “El Torito” Bootable CD-ROM Format Specification 1.0
- ATAPI Removable Media Device BIOS Specification 1.0


- MPS Specification 1.4 (for booting Linux SMP)

The BIOS ROM is a 1MB Serial Peripheral Interface (SPI) part. The runtime portion of the BIOS resides in a 128-K block from E0000h to FFFFFh.


3.1.2 Using Computer Setup (F10)

You can only open Computer Setup by turning on the workstation or restarting the system. To access the Computer Setup Utilities menu:

1. Turn on or restart the workstation.
2. When the **F10=Setup** appears on the screen, press the **F10** key to enter the utility.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and press the **F10** key again to access the utility.

3. Select your language from the list and press **Enter**.
In the Computer Setup Utilities menu, five headings are displayed: File, Storage, Security, Power, and Advanced.
4. Use the arrow (left and right) keys to select the appropriate heading. Use the arrow (up and down) keys to select the option you want, then press **Enter**.
5. To apply and save changes, select **File > Save Changes and Exit**.
 - If you have made changes that you do not want applied, select **Ignore Changes and Exit**.
 - To reset to factory settings, select **Apply Defaults and Exit**. This option restores the original factory system defaults.

 **CAUTION:** Do NOT turn the workstation power OFF while the ROM is saving your Computer Setup F10 changes. If you do, the CMOS could become corrupted. After you exit the Computer Setup screen, it is safe to turn off all power to the workstation.

3.1.3 Computer Setup Menu


 **NOTE:** This menu can change with new firmware releases, so it might not be consistent with what is presented in the following table.

Table 3-1 Computer Setup Menu Descriptions

Heading	Option	Description
File	System Information	Lists product name, SKU number, processor type/speed/stepping, cache size (L1/L2), installed memory size, integrated MAC, system BIOS, chassis serial number, and asset tracking number.
	About	Displays copyright information.
	Set Time and Date	Enables you to set system time and date.
	Flash System ROM	Diskette A: Enables you to upgrade the BIOS when a ROM image is saved on a diskette. CD-ROM Enables you to upgrade the BIOS when a ROM image is saved on a CD.
	Replicated Setup	Save to Removable Media Saves system configuration, including CMOS, to a formatted, blank 1.44-MB diskette in the CPQsetup.txt file. Save/Restore for is supported. Restore to Removable Media Restores system configuration from a diskette.
Default Setup		Save Current Settings as Default Saves the current settings as default settings for the next operation.
		Restore Factory Settings as Default Restores the factory settings as the default settings for the next operation.
	Apply Defaults and Exit	Restores factory default settings, which includes clearing any established passwords.
	Ignore Changes and Exit	Exits Computer Setup without applying or saving any changes.
	Save Changes and Exit	Saves changes to system configuration and exits Computer Setup.

Table 3-1 Computer Setup Menu Descriptions (continued)

Heading	Option	Description
Storage	Device Configuration	Lists all installed non-SCSI storage devices and provides options for getting specific information about each device. NOTE: SCSI storage drives will not be listed in Computer Setup (F10).
		Hard Disk Provides information about the hard disk drives in the system.
		CD-ROM Provides information about the hard disk drives in the system.
		Diskette Type (for legacy diskette drives only) Identifies the highest capacity media type accepted by the diskette drive. Options are 3.5" 1.44 MB, 5.25" 1.2 MB, and Not Installed.
		Default Values Multisector Transfers Options are 8, 16, and Disable. Transfer Mode Specifies the active data transfer mode. Options (subject to device capabilities) are Max UDMA, PIO0, Max PIO, Enhanced DMA, and Ultra DMA0 CAUTION: A new Automatic option has been added to allow for BIOS to automatically determine the translation mode used to configure a previously formatted SATA or USB mass storage device. This prevents you from having to know how the mass storage device was previously formatted. Ordinarily, the translation mode selected automatically by the BIOS should not be changed. If the selected translation mode is not compatible with the translation mode that was active when the disk was partitioned and formatted, the data on the disk will be inaccessible. Translation Mode Options are Automatic, Bit Shift, LBA Assisted, Use (Cylinders, Heads, Sectors), and Off.
		Storage Options Removable Media Boot Enables/disables ability to boot the system from removable media.
		Legacy Diskette Write Enables/disables ability to write data to removable media.
		BIOS DMA Transfers Enable/disables the BIOS use of DMA for transfers.
		SATA Emulation Options are Separate IDE Controller, Combined IDE Controller, RAID, and AHCI
		IDE Controller Enables/disables primary IDE controller.
DPS Self-test	Primary SATA Controller	Enables/disables SATA controller #0.
	Secondary SATA Controller	Enables/disables SATA controller #1.
Boot Order		Enables you to select a drive test.
		TIP: Shortcut to Temporarily Override Boot Order: To boot one time from a device other than the default device specified in Boot Order, restart the workstation and press F9 when the F10=Setup message appears on the screen. After POST is completed, a list of bootable devices is displayed. Use the arrow keys to select the preferred bootable device and press Enter . The workstation then boots from the selected non-default device for this one time. NOTE: MS-DOS drive lettering assignments might not apply after a non-MS-DOS operating system has started. Allows you to prioritize the devices boot order. Press Enter to drag a device to a preferred place. Press F5 to remove the device from consideration as a bootable device.
Controller Order		Allows you to specify the order of the attached hard drive controller. The first hard drive controller in the order will have priority in the boot sequence and will be recognized as drive C (if any devices are attached).

Table 3-1 Computer Setup Menu Descriptions (continued)

Heading	Option	Description
Security	Setup Password	Allows you to set and enable setup (administrator) password. NOTE: If the setup password is set, it is required to change Computer Setup options, flash the ROM, and make changes to certain PnP settings under Windows.
	Power-On Password	Allows you to set and enable power-on password.
	Smart Cover	Allows you to disable cover removal sensor or to notify user if sensor has been activated.
	Device Security	Serial Port Specifies if device is available or hidden to the OS. Parallel Port Specifies if device is available or hidden to the OS. All USB Ports Specifies if device is available or hidden to the OS. Front USB Ports Specifies if device is available or hidden to the OS. System Audio Specifies if device is available or hidden to the OS. Network Controller Specifies if device is available or hidden to the OS. Embedded Security Device Specifies if device is available or hidden to the OS.
	Network Service Boot	Enables/disables the ability to boot to the network by way of the F12 key or the boot order.
	System IDs	Allows you to set: <ul style="list-style-type: none"> Asset tag (16-byte identifier) and ownership tag (80-byte identifier displayed during POST). Universal Unique Identifier (UUID) number, which can only be updated if the current chassis serial number is invalid. (These ID numbers are normally set in the factory and are used to uniquely identify the system.) Keyboard locale setting (for example, English or German) for System ID entry.
	Data Execution Prevention	Enables/disables a mode that helps prevent OS security breaches.

Table 3-1 Computer Setup Menu Descriptions (continued)

Heading	Option	Description
Power	OS Power Management	Enables/disables ACPI S3 Support, ACPI S3 Hard Disk Reset, ACPI S3 P52 Mouse Wakeup, USB Wake on Device Insertion
	Hardware Power Management	Enables/disables SATA Power Management
	Thermal	Allows you set the rate of the system fan when CPU is in idle.

Table 3-1 Computer Setup Menu Descriptions (continued)

Heading	Option	Description
Advanced**	Power-On Options	<p>Allows you to set:</p> <ul style="list-style-type: none"> • POST Mode (QuickBoot, FullBoot, or FullBoot every 1–30 days). • POST Messages (enable/disable). • F9 Prompt (enable/disable). Enabling this feature will display the text F9=Boot Menu during POST. Disabling this feature prevents the text from being displayed. However, pressing the F9 key will still access the Shortcut Boot [Order] Menu screen. • F10 Prompt (enable/disable). Enabling this feature displays the text F10=Setup during POST. Disabling this feature prevents the text from being displayed but pressing F10 still accesses the Setup screen. • F12 Prompt (enable/disable). Enabling this feature displays the text F12=Network Service Boot during POST. Disabling this feature prevents the text from being displayed but pressing F12 still forces the system to attempt booting from the network. • Option ROM* prompt (enable/disable). Enabling this feature causes the system to display a message before loading options ROMs. • Remote Wakeup Boot Source • After Power Loss (on/off) • POST Delay (in seconds) (enable/disable). Enabling this feature adds a user-specified delay to the POST process. This delay is sometimes needed for hard disks on some PCI cards that spin up slowly—so slowly that they are not ready to boot by the time POST is finished. The POST delay also gives you more time to select F10 to enter Computer Setup (F10). • I/O APIC Mode (enable/disable) • Limit (PUID Maximum Value to 3) (enable/disable) • Setup Browse Mode (enable/disable) • ACPI/USB Buffers @ Top of Memory (enable/disable)
	Execute Memory Test	The system will reboot and any changes that have been made will be lost. The system might boot with memory in a sub-optimal configuration.
	BIOS Power-On	
	Onboard Devices	Enables you to set resources for or disable onboard system devices (serial ports, USB ports, diskette controllers, and so on).
	PCI Devices	<p>Enables you to set resources for the following devices:</p> <ul style="list-style-type: none"> Intel HD Audio Device (IRQ 5, 10, 11, or disable) Intel USB Controller (IRQ 5, 10, 11, or disable) Intel USB Controller (IRQ 5, 10, 11, or disable) Intel USB Controller (IRQ 5, 10, 11, or disable) Intel USB Controller (IRQ 5, 10, 11, or disable) Intel USB Controller (IRQ 5, 10, 11, or disable) Intel IDE Controller (enable/disable) Intel SATA Controller (IRQ 5, 10, 11, or disable) VGA Controller (IRQ 5, 10, 11, or disable) Broadcom Ethernet Controller (IRQ 5, 10, 11, or disable)
	Bus Options	<p>The options are:</p> <ul style="list-style-type: none"> PCI SERR# Generation (enable/disable) PCI VGA Palette Snooping (enable/disable) ECC Support (enable/disable) Memory Remapping (enable/disable)
	Device Options	<ul style="list-style-type: none"> Printer Mode (EPP + ECP, Output-Only, Bi-Directional) Num Lock State at Power-On (off/on) S5 Wake-on-LAN (enable/disable) Processor Cache (enable/disable) Unique Sleep State Blink Rates (enable/disable) Monitor Tracking (enable/disable) NIC PxE Option ROM Download (enable/disable)
	Slot 1 (PCI Express x 16)	Configures the option ROM.
	Slot 2 (PCI)	Configures the option ROM and latency timer.

Table 3-1 Computer Setup Menu Descriptions (continued)

Heading	Option	Description
	Slot 3 (PCI Express x 8' (x4))	Configures the option ROM.
	Slot 4 (PCI Express x1)	Configures the option ROM.
	Slot 5 PCI	Configures the option ROM and latency timer.
	Slot 6 PCI	Configures the option ROM and latency timer.


*Available on select models.

**These options should be used by advanced users only.

3.2 Desktop Management

HP Client Management Solutions (available for download from <http://www.hp.com/go/easydeploy>) provides standards-based solutions for managing and controlling workstations in a networked environment. This section summarizes the capabilities and features of the key components of desktop management:

- Section 3.2.1 “Initial Configuration and Deployment”
- Section 3.2.2 “Remote System Installation”
- Section 3.2.3 “Software Updating and Management”
- Section 3.2.4 “ROM Flash”
- Section 3.2.5 “Asset Tracking and Security”
- Section 3.2.6 “Fault Notification and Recovery”

 **NOTE:** Support for specific features described in this section might vary by model or software version.

3.2.1 Initial Configuration and Deployment

The workstation comes with a preinstalled system software image. After a brief software “unbundling” process, the workstation is ready to use.

You might prefer to replace the preinstalled software image with a customized set of system and application software. There are several methods for deploying a customized software image. They include:

- Installing additional software applications after unbundling the preinstalled software image.
- Using software deployment tools, such as Altiris Deployment Solutions™, to replace the preinstalled software with a customized software image.
- Using a disk-cloning process to copy the contents from one hard drive to another.

The best deployment method depends on your information technology environment and processes. The PC Deployment section of the HP Lifecycle Solutions Web site (<http://whp-sp-orig.extweb.hp.com/country/us/en/solutions.html>) provides information to help you select the best deployment method.

The *Restore Plus!* CD-ROM-based setup and ACPI hardware provide further assistance with recovery of system software, configuration management and troubleshooting, and power management.

3.2.2 Remote System Installation

Remote System Installation lets you start and set up your system using the software and configuration information located on a network server. This feature is usually used as a system setup and configuration tool, and can be used for the following tasks:

- Deploying a software image on one or more new PCs
- Formatting a hard drive
- Installing application software or drivers
- Updating the operating system, application software, or drivers

To initiate Remote System Installation, press **F12** when the **F12=Network Service Boot** message appears in the lower-right corner of the HP logo screen. Follow the on-screen instructions to continue the process. The default boot order is a BIOS configuration setting that can be changed to always attempt to PXE boot.

HP and Altiris have partnered to provide tools designed to make the task of corporate PC deployment and management easier and less time-consuming, ultimately lowering the total cost of ownership and making HP PCs the most manageable client PCs in the enterprise environment.

3.2.3 Software Updating and Management

HP provides several tools for managing and updating software on desktops and workstations—HP Client Manager Software, Altiris Client Management Solutions, System Software Manager, Proactive Change Notification, and Subscriber’s Choice.

HP Client Manager Software

HP Client Manager Software (HP CMS) assists HP customers in managing the hardware aspects of their client workstations with features that include:

- Detailed views of hardware inventory for asset management
- PC health check monitoring and diagnostics
- Proactive notification of changes in the hardware environment

- Web-accessible reporting of business critical details, such as machines with thermal warnings, memory alerts, and more
- Remote updating of system software such as device drivers and ROM BIOS
- Remote changing of boot order
- Configuring the system BIOS settings

For more information on the HP Client Manager, visit <http://www.hp.com/go/im>.

Altiris Client Management Solutions

HP and Altiris have partnered to provide comprehensive, tightly integrated systems management solutions to reduce the cost of owning HP client PCs. HP Client Manager Software is the foundation for additional Altiris Client Management Solutions that address:

- Inventory and Asset Management
 - SW license compliance
 - PC tracking and reporting
 - Lease contract, fixing asset tracking
- Deployment and Migration
 - Microsoft Windows XP Professional or Home Edition migration
 - System deployment
 - Personality migrations
- Help Desk and Problem Resolution
 - Managing help desk tickets
 - Remote troubleshooting
 - Remote problem resolution
 - Client disaster recovery
- Software and Operations Management
 - Ongoing desktop management
 - HP system SW deployment
 - Application self-healing

For more information and details on how to download a fully-functional 30-day evaluation version of the Altiris solutions, visit <http://h18000.www1.hp.com/im/prodinfo.html#deploy>.

For more information, visit <http://www.hp.com/go/easydisplay>.

System Software Manager

System Software Manager (SSM) is a utility that lets you update system-level software on multiple systems simultaneously. When executed on a PC client system, SSM detects both hardware and software versions, then updates the appropriate software from a central repository, also known as a file store. Driver versions that are supported by SSM are denoted with a special icon on the software, the driver download Web site, and on the Support Software CD. To download the utility or to obtain more information on SSM, visit <http://www.hp.com/go/ssm>.

Proactive Change Notification

The Proactive Change Notification program uses the Subscriber's Choice Web site to proactively and automatically:

- Send you Proactive Change Notification (PCN) e-mails informing you of hardware and software changes to most commercial workstations and servers, up to 60 days in advance.
- Send you e-mail containing Customer Bulletins, Customer Advisories, Customer Notes, Security Bulletins, and Driver alerts for most commercial workstations and servers.

You create your own profile to ensure that you only receive the information relevant to a specific IT environment. To learn more about the Proactive Change Notification program and create a custom profile, visit <http://www.hp.com/go/pcn>.

Subscriber's Choice

Subscriber's Choice is a client-based service from HP. Based on your profile, HP will supply you with personalized product tips, feature articles, driver and support alerts/notifications, or both. Subscriber's Choice Driver and Support Alerts/Notifications will deliver e-mails notifying you that the information you subscribed to in your profile is available for review and retrieval. To learn more about Subscriber's Choice and create a custom profile, visit <http://www.hp.com/go/pcn>.

3.2.4 ROM Flash

The workstation comes with a programmable read-only memory (ROM), also known as flash memory. By establishing a setup password in the Computer Setup (F10) Utility, you can protect the ROM from being unintentionally updated or overwritten. This is important to ensure the operating integrity of the workstation. If you need or want to upgrade the ROM, you can:

- Order an upgraded ROMPaq diskette from HP.
- Download the latest ROMPaq images from HP driver and support page: <http://www.hp.com/support/files>.

△ **CAUTION:** For maximum ROM protection, be sure to establish a setup password. The setup password prevents unauthorized ROM upgrades. System Software Manager allows the system administrator to set the setup password on one or more PCs simultaneously. For more information, visit <http://www.hp.com/go/ssm>.

△ **CAUTION:** The boot block jumper MUST NOT be installed during a ROM flash operation unless specified by HP. Normally, the boot block jumper is completely removed or installed only on pin 2. Installing the boot block jumper enables changing the boot block and defeats the FailSafe Boot Block ROM protection.

Remote ROM Flash

Remote ROM Flash allows the system administrator to safely upgrade the ROM on remote HP workstations directly from the centralized network management console. Enabling the system administrator to perform this task remotely on multiple workstations and personal computers results in a consistent deployment of and greater control over HP PC ROM images over the network. It also results in greater productivity and lower total cost of ownership.

The workstation must be powered on to take advantage of Remote ROM Flash.

For more information on Remote ROM Flash, see the HP Client Manager Software or System Software Manager at <http://h18000.www1.hp.com/im/prodinfo.html>.

HPQFlash

The HPQFlash utility is used to locally update or restore the system ROM on individual PCs through a Windows operating system.

For more information on HPQFlash, visit <http://www.hp.com/support/files> and enter the name of the workstation when prompted.

FailSafe Boot Block ROM

The FailSafe Boot Block ROM allows for system recovery in the unlikely event of a ROM flash failure; for example, if a power failure were to occur during a ROM upgrade. The Boot Block is a flash-protected section of the ROM that checks for a valid system ROM flash when power to the system is turned on.

- If the system ROM is valid, the system starts normally.
- If the system ROM fails the validation check, the FailSafe Boot Block ROM provides enough support to start the system from a ROMPaq diskette, which will program the system ROM with a valid image.

📖 **NOTE:** Some models also support recovery from a ROMPaq CD. ISO ROMPaq images are included with selected models in the downloadable ROM softpaqs.

When the boot block detects an invalid system ROM, the system beeps and the power LED blinks RED eight times. A Boot Block recovery mode message is displayed on the screen (some models).

To recover the system after it enters Boot Block recovery mode:

1. If there is a diskette in the diskette drive or a CD in the CD drive, remove the diskette and CD and turn off the power.
2. Insert a ROMPaq diskette into the diskette drive or, if permitted on this workstation, a ROMPaq CD into the CD drive.
3. Turn on the workstation.
If no ROMPaq diskette or ROMPaq CD is found, you will be prompted to insert one and restart the workstation. If a setup password has been established, the Caps Lock light will turn on (on PS/2 keyboard only) and you will be prompted to enter the password.
4. Enter the setup password.
If the system successfully starts from the diskette and successfully reprograms the ROM, then the three keyboard lights will turn on. A rising tone series of beeps also signals successful completion.
5. Remove the diskette or CD and turn the power off.

6. Turn the power on again to restart the workstation.

The following table lists the various keyboard light combinations used by the Boot Block ROM (when a PS/2 keyboard is attached to the workstation), and explains the meaning and action associated with each combination.


Table 3-2 Keyboard Light Combinations Used by Boot Block ROM

FailSafe Boot Block Mode	Keyboard LED Activity	State/Message
Num Lock	On	ROMPaq diskette or ROMPaq CD not present, is bad, or drive not ready.
Caps Lock	On	Enter password.
Num, Caps, Scroll Lock	Blink On in sequence, one at a time—N,C, SL	Keyboard locked in network mode.
Num, Caps, Scroll Lock	On	Boot Block ROM Flash successful. Turn power off, then on to reboot.

NOTE: Diagnostic lights do not flash on USB keyboards


Replicating the Setup

The following procedures give an administrator the ability to easily copy one setup configuration to other workstations of the same model. This allows for faster, more consistent configuration of multiple workstations.

 **NOTE:** Both procedures require a diskette drive.

 **NOTE:** To collect and replicate BIOS settings on multiple computers, use System Software Manager or HP Client Manager Software. For more information, visit <http://www.hp.com/go/easydeploy>.

Copying to a Single Workstation

 **CAUTION:** A setup configuration is model-specific. File system corruption might result if source and target workstations are not the same model. For example, do not copy the setup configuration from an HP xw4200 Workstation to an HP xw4300 Workstation.

1. Select a setup configuration to copy. Turn off the workstation.
2. Turn on the workstation.
3. When the **F10=Setup** appears on the screen, press the **F10** key to enter the utility.


 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and try again.

4. If you are using a diskette, insert it now.
5. Click **File > Save to Diskette**. Follow the instructions on the screen to create the configuration diskette.
6. Turn off the workstation to be configured and insert the configuration diskette.
7. Turn on the workstation to be configured.
8. When the **F10=Setup** appears on the screen, press the **F10** key to enter the utility.


 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and try again.

9. Click **File > Restore from Diskette** and follow the on-screen instructions.
10. Restart the workstation when the configuration is complete.

Copying to Multiple Workstations

 **CAUTION:** A setup configuration is model-specific. File system corruption might result if source and target workstations are not the same model. For example, do not copy the setup configuration from a HP Workstation xw4200 to HP xw4300 Workstation.

This method takes a little longer to prepare the configuration diskette, but copying the configuration to target workstations is significantly faster.

 **NOTE:** A bootable diskette is required for this procedure. If Windows XP is not available to create a bootable diskette, use the method for copying to a single workstation instead (see “Copying to a Single Workstation” on page 40).

1. Create a bootable diskette.
2. Select a setup configuration to copy.
3. Download a BIOS utility for replicating setup (repset.exe) and copy it onto the configuration diskette. To obtain this utility, go to <http://welcome.hp.com/support/files> and enter the model number of the workstation.
4. On the configuration diskette, create an autoexec.bat file containing the following command: **repset.exe**.
5. Restart the workstation.
6. When the F10=Setup appears on the screen, press the **F10** key to enter the utility.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and try again.

7. Insert the diskette now.
8. Click **File > Replicated Setup > Save to Diskette**. Follow the on-screen instructions to create the configuration diskette.
9. Turn off the workstation to be configured. Insert the configuration diskette and turn the workstation on. The configuration utility will run automatically.
10. Restart the workstation when the configuration is complete.


Dual-State Power Button

With Advanced Configuration and Power Interface (ACPI) enabled, the power button can function either as an on/off switch or as a Standby button. The Standby feature does not completely turn off power, but instead causes the workstation to enter a low-power standby state. This allows you to power down quickly without closing applications and to return quickly to the same operational state without any data loss.

To change the power button configuration:

1. Click **Start > Control Panel > Power Options**.
2. In the **Power Options Properties**, select the **Advanced** tab.
3. In the **Power Button** section, select **Standby**.

After configuring the power button to function as a Standby button, press the power button to put the system in a very low power state (Standby). Press the button again to quickly bring the system out of Standby to full power status. To completely turn off all power to the system, press and hold the power button for four seconds.

 **CAUTION:** Do not use the power button to turn off the workstation unless the system is not responding; turning off the power without operating system interaction could cause damage to or loss of data on the hard drive.

World Wide Web Site

HP engineers rigorously test and debug software developed by HP and third-party suppliers, and develop operating system specific support software, to ensure performance, compatibility, and reliability for HP workstations.

When making the transition to new or revised operating systems, it is important to implement the support software designed for that operating system. If you plan to run a version of Microsoft Windows that is different from the version included with the workstation, you must install corresponding device drivers and utilities to ensure that all features are supported and functioning properly.

HP has made the task of locating, accessing, evaluating, and installing the latest support software easier. You can download the software from <http://www.hp.com/support>.

The Web site contains the latest device drivers, utilities, and flashable ROM images needed to run the latest Microsoft Windows operating system on the HP workstation.

Building Blocks and Partners


HP management solutions integrate with other systems management applications, and are based on industry standards, such as:

- Web-Based Enterprise Management (WBEM)
- Windows Management Interface (WMI)
- Wake on LAN Technology
- ACPI
- SMBIOS
- Pre-boot Execution (PXE) support

3.2.5 Asset Tracking and Security

Asset tracking features incorporated into the workstation provide key asset tracking data that can be managed using HP Systems Insight Manager, HP Client Manager Software, or other system management applications. Seamless, automatic integration between asset tracking features and these products enables you to choose the management tool that is best suited to the environment and to leverage the investment in existing tools.

HP also offers several solutions for controlling access to valuable components and information. ProtectTools Embedded Security, if installed, prevents unauthorized access to data and checks system integrity and authenticates third-party users attempting system access. Security features, such as ProtectTools and the Hood Sensor (Smart Cover Sensor) help to prevent unauthorized access to the internal components of the workstation. By disabling parallel, serial, or USB ports, or by disabling removable media boot capability, you can protect valuable data assets. Memory Change and Hood Sensor (Smart Cover Sensor) alerts can be automatically forwarded to system management applications to deliver proactive notification of tampering with a workstation's internal components.

 **NOTE:** ProtectTools, the Hood Sensor (Smart Cover Sensor), and the Hood Lock (Smart Cover Lock) are available as options on select systems.

Use the following utilities to manage security settings on the HP Workstation:

- Locally, using the Computer Setup Utilities.
- Remotely, using HP Client Manager Software or System Software Manager. This software enables the secure, consistent deployment and control of security settings from a simple command-line utility.

The following table and sections refer to managing security features of the workstation locally through the Computer Setup (F10) Utilities.

Table 3-3 Security Features Overview


Feature	Purpose	How It Is Established
Removable Media Boot Control	Prevents booting from the removable media drives.	From the Setup Utilities menu.
Serial, USB, 1394, network, or SCSI Interface Control	Prevents transfer of data through the integrated serial, USB, or infrared interface.	From the Setup Utilities menu.
Power-On Password	Prevents use of the workstation until the password is entered. This can apply to both initial system startup and restarts.	From the Setup Utilities menu.
Setup Password	Prevents reconfiguration of the workstation (use of the Setup Utilities) until the password is entered.	From the Setup Utilities menu.
Network Server Mode	Provides unique security features for workstations being used as servers.	From the Setup Utilities menu.

For more information about Computer Setup, refer to [“Computer Setup Menu” on page 31](#).

Password Security

The power-on password prevents unauthorized use of the workstation by requiring entry of a password to access applications or data each time the workstation is turned on or restarted. The setup password specifically prevents unauthorized access to Computer Setup, and can also be used as an override to the power-on password. That is, when prompted for the power-on password, entering the setup password instead will allow access to the workstation.

A network-wide setup password can be established to enable the system administrator to log in to all network systems to perform maintenance without having to know the power-on password.


 **NOTE:** System Software Manager and HP Client Manager Software allow remote management of Setup Passwords and other BIOS settings in a networked environment. For more information, visit <http://www.hp.com/go/easydeploy>.

Establishing a Setup Password Using Computer Setup

Establishing a setup password through Computer Setup prevents reconfiguration of the workstation (use of the Computer Setup (F10) utility) until the password is entered.

To establish a setup password using computer setup:

1. Turn on or restart the workstation.
2. As soon as the computer is turned on, press and hold the **F10** until you enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and press and hold the **F10** key again to access the utility.

If you are using a PS/2 keyboard, you might see a Keyboard Error message—disregard it.

3. Select **Security > Setup Password** and follow the on-screen instructions.
4. Before exiting, select **File > Save Changes and Exit**.


Establishing a Power-On Password Using Computer Setup

Establishing a power-on password through Computer Setup prevents access to the workstation when power is turned on, unless the password is entered. When a power-on password is set, Computer Setup presents Password Options under the Security menu. The password options include Network Server Mode and Password Prompt on Warm Boot.

When Network Server Mode is disabled, the password must be entered each time the workstation is turned on when the key icon appears on the monitor. When Password Prompt on Warm Boot is enabled, the password must also be entered each time the workstation is rebooted. When Network Server Mode is enabled, the password prompt is not presented during POST, but any attached PS/2 keyboard will remain locked until the user enters the power-on computer.

To establish a power-on password through Computer Setup:

1. Turn on or restart the workstation.
2. As soon as the computer is turned on, press and hold the **F10** until you enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and press and hold the **F10** key again to access the utility.


If you are using a PS/2 keyboard, you might see a Keyboard Error message—disregard it.

3. Select **Security > Power-On Password** and follow the on-screen instructions.
4. Before exiting, select **File > Save Changes and Exit**.

Entering a Power-On Password

To enter a power-on password:

1. Turn on or restart the workstation.
2. When the key icon appears on the monitor, enter the current password, then press **Enter**.

 **NOTE:** Type carefully. For security reasons, the characters you enter do not appear on the screen.

If you enter the password incorrectly, a broken key icon appears. Try again. After three unsuccessful tries, you must turn off the workstation, then turn it on again before you can continue.

Entering a Setup Password


If a setup password has been established on the workstation, you will be prompted to enter it each time you run Computer Setup.

To enter a setup password:

1. Turn on or restart the workstation.
2. When the **F10=Setup** appears on the screen, press the **F10** key to enter the utility.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and try again.

3. When the key icon appears on the monitor, enter the setup password, then press **Enter**.

 **NOTE:** Type carefully. For security reasons, the characters you enter do not appear on the screen.

If you enter the password incorrectly, a broken key icon appears. Try again. After three unsuccessful tries, you must turn off the workstation, then turn it on again before you can continue.

Changing a Power-On or Setup Password

To change a power-on or setup password:


1. Turn on or restart the workstation. To change the setup password, run Computer Setup.
2. To change the Power-On password, go to step 3.

To change the Setup password, when the F10=Setup appears on the screen, press the **F10** key to enter the utility.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and try again.


3. When the key icon appears, type the current password, a slash (/) or alternate delimiter character, your new password, another slash (/) or alternate delimiter character, and your new password again as shown:

```
current password/new password/new password
```

 **NOTE:** Type carefully. For security reasons, the characters you enter do not appear on the screen.

4. Press **Enter**.

The new password takes effect the next time you turn on the workstation.

 **NOTE:** See the “National Keyboard Delimiter Characters” on page 44 for information about the alternate delimiter characters. The power-on password and setup password can also be changed using the Security options in Computer Setup.

Deleting a Power-On or Setup Password

To delete a power-on or setup password:


1. Turn on or restart the workstation.
2. To delete the Power-On password, go to Step 3.
To delete the Setup Password, when the F10=Setup appears on the screen, press the **F10** key to enter the utility.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and try again.

When the key icon appears, enter your current password followed by a slash (/) or alternate delimiter character as shown:

```
current password/
```

3. Press **Enter**.

 **NOTE:** See the “National Keyboard Delimiter Characters” on page 44 section for information about the alternate delimiter characters. The power-on password and setup password can also be changed using the Security options in Computer Setup.

National Keyboard Delimiter Characters

Each keyboard is designed to meet country-specific requirements. The syntax and keys that you use for changing or deleting your password depend on the keyboard that came with your workstation.

Table 3-4 National Keyboard Delimiter Characters

Arabic	/	Greek	-	Russian	/
Belgian	=	Hebrew	.	Slovakian	-
BHCSY*	-	Hungarian	-	Spanish	-
Brazilian	/	Italian	-	Swedish/Finnish	/
Chinese	/	Japanese	/	Swiss	-
Czech	-	Korean	/	Taiwanese	/
Danish	-	Latin American	-	Thai	/
French	!	Norwegian	-	Turkish	.
French Canadian	é	Polish	-	U.K. English	/
German	-	Portuguese	-	U.S. English	/

*For Bosnia-Herzegovina, Croatia, Slovenia, and Yugoslavia

Clearing Passwords

If you forget your password, you cannot access the workstation. Refer to “Additional Password Security and Resetting CMOS” on page 147 for instructions on clearing passwords.

Hood Sensor (Smart Cover Sensor)

The hood sensor is a combination of hardware and software technology that can alert you when the workstation side access panel has been removed. This feature is sold with the Solenoid Hood (Smart Cover) Lock. There are three levels of protection, as described in the following table.

Table 3-5 Hood Sensor Protection Levels

Level	Setting	Description
Level 0	Disable	Hood sensor is disabled (default).
Level 1	Notify User	When the workstation is restarted, the screen displays a message indicating that the workstation side access panel has been removed.
Level 2	Password	When the workstation is restarted, the screen displays a message indicating that the workstation access panel has been removed. You must enter the setup password to continue. This option is only available if an administrator password is set.

NOTE: These settings can be changed using Computer Setup.

Setting the hood sensor protection level

To set the hood sensor protection level:


1. Turn on or restart the workstation.
2. When the **F10=Setup** appears on the screen, press the **F10** key to enter the utility.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and try again.

3. Select **Security > Smart Cover > Cover Removal Sensor**, then side access panel, and follow the on-screen instructions.
4. Before exiting, click **File > Save Changes and Exit**.

Solenoid Hood (Smart Cover) Lock

The solenoid hood lock is available as an option on HP Workstation xw4300 models (this option comes as a kit that includes the hood sensor). When installed, the solenoid hood lock can prevent unauthorized access to the internal components. This kit is sold with the Hood Sensor.

 **CAUTION:** For maximum cover lock security, be sure to establish a setup password. The setup password prevents unauthorized access to the Computer Setup utility.

Locking the Solenoid Hood Lock

To activate and lock the solenoid hood lock:

1. Turn on or restart the workstation.
2. Wait for the **F10=Setup** prompt to appear on the lower right corner of the screen. Once you see the prompt, press the **F10** key to enter the F10 setup utility.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and try again to access the utility.

3. Select **Security > Smart Cover > Cover Lock > Lock** option.
4. Before exiting, select **File > Save Changes and Exit**.

Unlocking the Solenoid Hood Lock

To unlock the solenoid hood lock:

1. Turn on or restart the workstation.
2. Wait for the **F10=Setup** prompt to appear on the lower right corner of the screen. Once you see the prompt, press the **F10** key to enter the F10 setup utility.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and try again to access the utility.


3. Select **Security > Smart Cover > Cover Lock > Unlock**.

4. Before exiting, select **File > Save Changes and Exit**.

Using the Access Panel Failsafe Key

If you enable the solenoid hood lock and cannot enter your password to disable the lock, you will need an access panel FailSafe Key to open the workstation access panel. You will need the key in any of the following circumstances:

- Power outage
- Startup failure
- PC component failure (such as processor or power supply)
- Forgotten password

 **CAUTION:** The access panel FailSafe Key (T-15 wrench) is a specialized tool available from HP. It is beneficial to order this key before you need one.

To obtain the FailSafe Key, complete any one of the following tasks:

- Contact your authorized HP reseller or service provider.
- Visit the HP Web site (<http://www.hp.com>) for ordering information.
- Visit the Contact HP Worldwide Web site (<http://welcome.hp.com/country/us/en/wwcontact.html>) for contact information.

Cable Lock Slot

The rear panel of the chassis can accommodate a cable lock accessory that allows the workstation to be physically secured to a work area and prevents access panel from being removed.

Padlock Loop (Optional)

Prevents access panel from being removed. This loop can also be used to secure the unit to a fixed object.

Universal Chassis Clamp Lock (Optional)

The version without a cable discourages access panel removal and prevents theft of I/O devices. The version with a cable also prevents entire system theft and allows multiple systems to be secured with a single cable.

Master Boot Record Security

The MBR contains information needed to successfully boot from a disk and to access the data stored on the disk. Master Boot Record Security detects and reports unintentional or malicious changes to the MBR, such as those caused by some workstation viruses or by the incorrect use of certain disk utilities. It also allows you to recover the “last known good” MBR, should changes to the MBR be detected when the system is restarted.

To enable MBR Security:

1. Turn on or restart the workstation.
2. Wait for the **F10=Setup** prompt to appear on the lower right corner of the screen. Once you see the prompt, press the **F10** key to enter the F10 setup utility.


 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and try again to access the utility.

3. Select **Security > Master Boot Record Security > Enabled**.

4. Select **Security > Save Master Boot Record**.

5. Before exiting, select **File > Save Changes and Exit**.

When MBR Security is enabled, the BIOS prevents any changes being made to the MBR of the current bootable disk while in MS-DOS or Windows Safe Mode.

 **NOTE:** Most operating systems control access to the MBR of the current bootable disk; the BIOS cannot prevent changes that might occur while the operating system is running.

Each time the workstation is turned on or restarted, the BIOS compares the MBR of the current bootable disk to the previously saved MBR. If changes are detected and if the current bootable disk is the same disk from which the MBR was previously saved, the following message is displayed:

1999 - Master Boot Record has changed.
Press any key to enter Setup to configure MBR Security.

Upon entering Computer Setup, you must perform one of the following tasks:

- Save the MBR of the current bootable disk
- Restore the previously saved MBR
- Disable the MBR Security feature

You must know the setup password, if one exists.

If changes are detected and if the current bootable disk is not the same disk from which the MBR was previously saved, the following message is displayed:

2000 - Master Boot Record Hard Drive has changed.
Press any key to enter Setup to configure MBR Security.

Upon entering Computer Setup, you must perform one of the following tasks:

- Save the MBR of the current bootable disk
- Disable the MBR Security feature

You must know the setup password, if one exists.

In the unlikely event that the previously saved MBR has been corrupted, the following message is displayed:

1998 - Master Boot Record has been lost.
Press any key to enter Setup to configure MBR Security.

Upon entering Computer Setup, you must perform one of the following tasks:

- Save the MBR of the current bootable disk
- Disable the MBR Security feature


You must know the setup password, if one exists.

Before You Partition or Format the Current Bootable Disk

Before you partition or format the current bootable disk, ensure that MBR Security is disabled before you change partitioning or formatting of the current bootable disk. Some disk utilities, such as FDISK and FORMAT, attempt to update the MBR. If MBR Security is enabled when you change partitioning or formatting of the disk, you might receive error messages from the disk utility or a warning from MBR Security the next time the workstation is turned on or restarted.

To disable MBR Security:

1. Turn on or restart the workstation.
2. Wait for the **F10=Setup** prompt to appear on the lower right corner of the screen. Once you see the prompt, press the **F10** key to enter the F10 setup utility.

 **NOTE:** If you do not press **F10** key at the appropriate time, you must restart the workstation and try again to access the utility.

3. Select **Security > Master Boot Record Security > Disabled**.
4. Before exiting, select **File > Save Changes and Exit**.

Rear Port Controller Cover (Optional)

Clips to the back of the workstation and secures your I/O devices and prevents any cables at the back of the workstation from being removed.

3.2.6 Fault Notification and Recovery

Fault Notification and Recovery features combine innovative hardware and software technology to prevent the loss of critical data and minimize unplanned downtime.

If the workstation is connected to a network managed by HP Client Manager Software, the computer sends a fault notice to the network management application. With HP Client Manager Software, you can also remotely schedule diagnostics to automatically run on all managed PCs and create a summary report of failed tests.

Drive Protection System

The DPS is a diagnostic tool built into the hard drives installed in select HP workstations. DPS is designed to help diagnose problems that might result in unwarranted hard drive replacement.

When HP workstations are built, each installed hard drive is tested using DPS, and a permanent record of key information is written onto the drive. Each time DPS is run, test results are written to the hard drive. The service provider can use this information to help diagnose conditions that caused you to run the DPS software.

ECC Fault Prediction and Prefailure Warranty

When the workstation encounters an excessive number of error checking and correcting (ECC) memory errors, the workstation displays a Local Alert message. This message contains detailed information about the errant memory module, allowing you to take action before you experience non-correctable memory errors. The Prefailure Warranty for ECC memory modules allows you to replace these modules, free of charge, before the modules actually fail. ECC memory modules are optional on selected HP systems.



NOTE: To use this feature, you must replace the standard DIMMs with HP ECC DIMMs.

Surge-Tolerant Power Supply

An integrated surge-tolerant power supply provides greater reliability when the workstation is hit with an unpredictable power surge. This power supply is rated to withstand a power surge of up to 2000V (Line to PE or Neutral to PE) and 1000V (Line to Line) without any data loss or system downtime.

Thermal Sensor

The thermal sensors are hardware and software features that track the internal temperature of the workstation. Based on those readings, the sensors influence the speed of the internal fans. The sensors can also cause the system to execute slowly or shut down when predetermined temperature limits are exceeded. When combined with HP Client Manager Software, this feature notifies the network administrator when the normal range is exceeded.

4 Removal and Replacement Procedures

This chapter describes removal and replacement procedures of most internal components.

- Section 4.1 "Service Considerations"
- Section 4.2 "Pre-Disassembly Procedures"
- Section 4.3 "System Board"
- Section 4.4 "Steps for Removal and Replacement of Components"
- Section 4.5 "Disassembly Order"
- Section 4.6 "Security Lock (Optional)"
- Section 4.7 "Cable Lock (Optional)"
- Section 4.8 "Universal Chassis Clamp Lock (Optional)"
- Section 4.9 "Access Panel"
- Section 4.10 "Hood Sensor"
- Section 4.11 "Solenoid Hood (Smart Cover) Lock (Optional)"
- Section 4.12 "Front Bezel"
- Section 4.13 "Bezel Blanks"
- Section 4.14 "Front Panel I/O Device Assembly"
- Section 4.15 "Power Button"
- Section 4.16 "System Speaker"
- Section 4.17 "Power Supply"
- Section 4.18 "System Fan"
- Section 4.19 "Memory"
- Section 4.20 "Peripheral Component Interconnect (PCI) Slots"
- Section 4.21 "Front Fan (Optional)"
- Section 4.22 "Battery"
- Section 4.23 "Power Connections"
- Section 4.24 "Optical Drive (Minitower Position)"
- Section 4.25 "Optical Drive (Desktop Position)"
- Section 4.26 "Diskette Drive"
- Section 4.27 "SCSI Hard Disk Drive"
- Section 4.28 "SATA Hard Drive"
- Section 4.29 "CPU Heatsink"
- Section 4.30 "Processor"
- Section 4.31 "System Board"

4.1 Service Considerations

The following sections discuss service considerations that should be reviewed and practiced before removing and replacing any system components.

- ⚠ **WARNING!** When lifting or moving the workstation, do not use the front bezel as a handle or lifting point. Lifting the workstation from the front bezel or lifting it incorrectly can cause the unit to fall and harm the user and damage the workstation. To properly and safely lift the workstation, lift it from the bottom of the unit.

- Section 4.1.1 “Cautions, Warnings, and Safety Precautions”
- Section 4.1.2 “Electrostatic Discharge Information”
- Section 4.1.3 “Tools and Software Requirements”
- Section 4.1.4 “Special Handling of Components”

4.1.1 Cautions, Warnings, and Safety Precautions

For your safety, you must review the “Important Safety Warnings” on page 8 before accessing the components of the workstation. Also, review the *Safety and Regulatory Guide* that came with your workstation for more information.

- ⚠ **WARNING!** *Avoid Burn Injuries.* Some parts inside the computer will be hot. Turn off and unplug the system, then wait approximately three to five minutes for them to cool down before opening the system access panels or touching internal components.

4.1.2 Electrostatic Discharge Information

A sudden discharge of static electricity from your finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) might not appear to be affected at all and can work perfectly throughout a normal cycle. The device can function normally for a while, but it has been degraded in the internal layers, reducing its life expectancy.

Networks built into many integrated circuits provide some protection, but in many cases, the discharge contains enough power to alter device parameters or melt silicon junctions.

Generating Static

The following table shows that:

- Different activities generate different amounts of static electricity.
- Static electricity increases as humidity decreases.

Table 4-6 Static Electricity

Event	Relative Humidity		
	55%	40%	10%
Walking across carpet	7,500V	15,000V	35,000V
Walking across vinyl floor	3,000V	5,000V	12,000V
Motions of bench worker	400V	800V	6,000V
Removing bubble pack from PCB	7,000V	20,000V	26,500V
Packing PCBs in foam-lined box	5,000V	11,000V	21,000V

NOTE: 700V can degrade a product.

Preventing Electrostatic Damage to Equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. The following packaging and grounding precautions are necessary to prevent damage to electric components and accessories.

- Transport products in static-safe containers, such as tubes, bags, or boxes to avoid hand contact.
- Protect all electrostatic parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic sensitive parts in their containers until they arrive at static-free stations.
- Place items on a grounded surface before removing them from their container.
- When handling or touching a sensitive component or assembly, ground yourself by touching the chassis.
- Avoid contact with pins, leads, or circuitry.

- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or conductive foam.

Personal Grounding Methods and Equipment

Use the following equipment to prevent static electricity damage to equipment:

- Wrist straps are flexible straps with a maximum of one-megohm \pm 10% resistance in the ground cords. To provide a proper ground, wear the strap against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.
- Heel straps, toe straps, and boot straps can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use them on both feet with a maximum of one-megohm \pm 10% resistance between the operator and ground.

Table 4-7 Static Shielding Protection Levels

Method	Voltage
Antistatic plastic	1,500
Carbon-loaded plastic	7,500
Metallized laminate	15,000

Grounding the Work Area

To prevent static damage at the work area:

- Cover the work surface with approved static-dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Use static-dissipative mats, foot straps, or air ionizers to give added protection.
- Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free work areas.
- Turn off power and input signals before inserting and removing connectors or test equipment.
- Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.
- Keep work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

Recommended Materials and Equipment

Materials and equipment that are recommended for use in preventing static electricity include:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids
- Conductive foam
- Conductive tabletop workstations with ground cord of one-megohm \pm 10% resistance
- Static-dissipative table or floor mats with hard tie to ground
- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing one-megohm \pm 10% resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes

4.1.3 Tools and Software Requirements


- Torx T-15 driver or flat-bladed screwdriver
- Phillips screwdriver
- Diagnostics software

- Tamper-resistant T-15 wrench (Failsafe key) or tamper-resistant bits (required if you get locked out by solenoid hood lock)

Screws

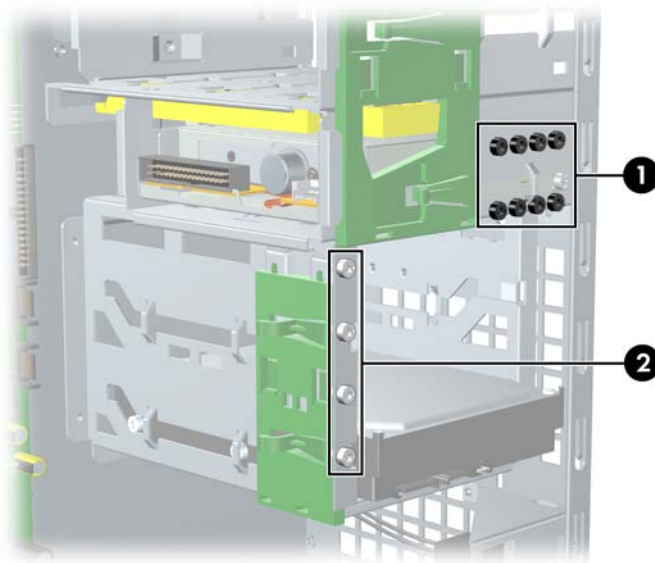
The screws used in the workstation are not interchangeable. They might have standard or metric threads and might be of different lengths. If an incorrect screw is used during the reassembly process, it can damage the unit. HP strongly recommends that all screws removed during disassembly be kept with the removed part, then returned to their proper locations.

 **NOTE:** Metric screws have a black finish. American National (unified) screws have a silver finish.

 **NOTE:** As each subassembly is removed from the workstation, place the subassembly away from the work area to prevent damage.

If necessary, additional drive guide screws are provided on the system chassis. There are eight Metric screws located on the chassis near the 5.25-inch optical drive bays. These screws can be used to mount additional optical drives or an optional diskette drive. There are four American National screws located on the chassis near the hard drive. These screws can be used to mount additional hard drives in the 3.5" hard drive cage. For more information about this procedure, see ["Installing Hard Drives in the Optical Drive Bay \(Optional\)" on page 87](#).

 **NOTE:** The Metric (black) and American National (silver) screws are not interchangeable.




1 Metric screws (8)

2 American National screws (4)

4.1.4 Special Handling of Components

The following components require special handling when servicing the workstation.

 **WARNING!** Do not use the front bezel as a handle or lifting point when lifting or moving the workstation. Lifting the workstation from the front bezel or lifting it incorrectly could cause the unit to fall and cause harm to the user and damage to the workstation. To properly and safely lift the workstation, lift it from the bottom of the unit from either the desktop or minitower configuration.

Cables and Connectors

Cables must be handled with care to avoid damage. Apply only the tension required to seat or unseat the cables during insertion or removal from the connector. Handle cables by the connector or pull strap whenever possible. In all cases, avoid bending or twisting the cables, and be sure that the cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced.

- △ **CAUTION:** When servicing this workstation, be sure that cables are placed in their proper location during the reassembly process. Improper cable placement can damage the workstation.

Hard Drives

Handle hard drives as delicate, precision components, avoiding all physical shock and vibration. This applies to failed drives as well as replacement spares.

- If a drive must be mailed, place the drive in a bubble-pack mailer or other suitable protective packaging and label the package "Fragile: Handle With Care."
- Do not remove hard drives from the shipping package for storage. Keep hard drives in their protective packaging until they are actually mounted in the workstation.
- Avoid dropping drives from any height onto any surface.
- If you are inserting or removing a hard drive, turn off the workstation. Do not remove a hard drive while the workstation is on or in Standby mode.
- Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector. For more information about preventing electrostatic damage, refer to "[Electrostatic Discharge Information](#)" on page 50.
- Do not use excessive force when inserting a drive.
- Avoid exposing a hard drive to liquids, temperature extremes, or products that have magnetic fields such as monitors or speakers.

Lithium Coin Cell Battery

The battery that comes with the workstation provides power to the real-time clock and has a minimum lifetime of about three years.

For instructions on battery removal and replacement, see the "[Battery](#)" on page 76.

- △ **WARNING!** This workstation contains a lithium battery. There is a risk of fire and chemical burn if the battery is handled improperly. Do not disassemble, crush, puncture, short external contacts, dispose in water or fire, or expose it to temperatures higher than 140 F (60 C).



CAUTION: Batteries, battery packs, and accumulators should not be disposed of together with the general household waste.

4.2 Pre-Disassembly Procedures

Before servicing the workstation:

1. Close any open software applications.
2. Remove any diskette or compact disc from the workstation.
3. Exit the operating system.
4. Turn off the workstation and any peripheral devices that are connected to it.
5. Remove/disengage any security devices that prohibit opening the workstation.

△ **CAUTION:** Turn off the workstation before disconnecting any cables.

△ **CAUTION:** The cooling fan is off **only** when the workstation is turned off or the power cable has been disconnected. The cooling fan is always on when the workstation is in the "On," "Standby," or "Suspend" modes. You must disconnect the power cord from the power source before opening the workstation to prevent system board or component damage.

6. Disconnect the power cord from the electrical outlet and then from the workstation.
7. Disconnect all peripheral device cables from the workstation.

4.3 System Board

This section provides additional information about the system board.

- Section 4.3.1 "System Board Components"
- Section 4.3.2 "System Board Architecture"

4.3.1 System Board Components

The following illustration shows the system board connectors and sockets on the HP xw4300 Workstation.

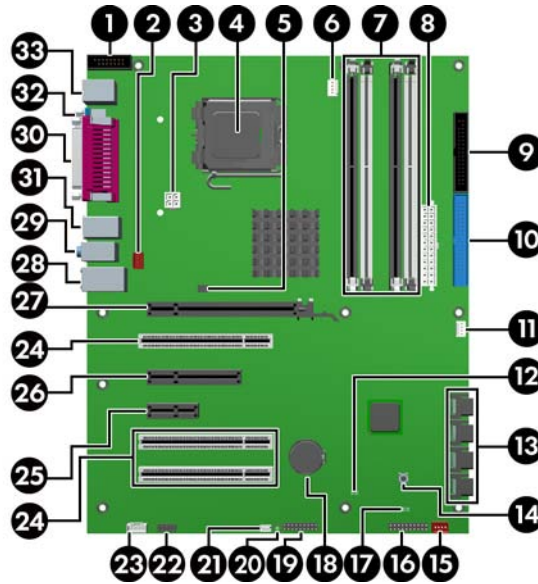


Table 4-8 System Board Components

1	Second serial port adapter	13	Serial ATA ports	25	PCI
2	Rear fan	14	Clear CMOS button	26	PCI Express x1
3	Processor power connector	15	Front chassis fan	27	PCI Express x8' (x4)
4	Processor	16	Front control panel	28	PCI
5	Solenoid hood lock	17	Password jumper	29	PCI Express x16
6	Processor fan connector	18	Battery	30	Network/USB
7	Memory module sockets	19	Front USB	31	Audio
8	Main power	20	Hard disk activity LED	32	USB
9	Diskette drive connector	21	Chassis speaker	33	Parallel
10	Primary IDE* connector	22	Front audio	34	Serial
11	Chassis intrusion switch	23	Auxiliary audio	35	Keyboard/mouse
12	Boot block jumper	24	CD-ROM audio		

*The Primary IDE connector is only used for optical drives.

4.4 Steps for Removal and Replacement of Components

This section discusses the procedures necessary to remove and install various hardware components on your workstation. Review the safety and precautions and [“Service Considerations” on page 50](#), as well as the *Safety and Regulatory Guide*, before servicing or upgrading your system.

1. Read all safety information and precautions.
2. Locate and clear a suitable work area.
3. Shut down the system and remove power from the unit.
4. Gather your tools.
5. Service your unit.
6. Restore power to your unit.

4.5 Disassembly Order

Use the following table to determine the sequence in which to remove the major components.

Pre-Disassembly (section 4.2)	
Locks (section 4.6)	
Access Panel (section 4.9)	
Hood Sensor (section 4.10)	
Front Bezel (section 4.12)	
	Front Panel I/O Assembly (section 4.14)
	Power Button (section 4.15)
	Optical Drive (section 4.24)
	Diskette Drive (section 4.26)
	Bezel Blanks (section 4.13)
System Speaker (section 4.16)	
Power Supply (section 4.17)	
System Fan (section 4.18)	
Memory (section 4.19)	
Battery (section 4.22)	
Hard Drive (section 4.27)	
Processor Heatsink (section 4.29)	
	Processor (section 4.30)
PCI or PCI Express Cards (section 4.20)	
System Board (section 4.31)	

4.6 Security Lock (Optional)

If a security lock is installed, remove it before servicing the unit. To remove the security lock, unlock it and slide it out of the padlock loop as shown in the following illustration.



4.7 Cable Lock (Optional)

If a cable lock is installed, remove it before servicing the unit. To remove the cable lock, unlock it and pull it out of the cable lock slot as shown in the following illustration.



4.8 Universal Chassis Clamp Lock (Optional)

If a universal chassis clamp lock is installed, remove it before servicing the unit.

To remove the lock:

1. Unlock the device and remove the locking mechanism.



2. Remove the screw attaching the lock to the chassis.



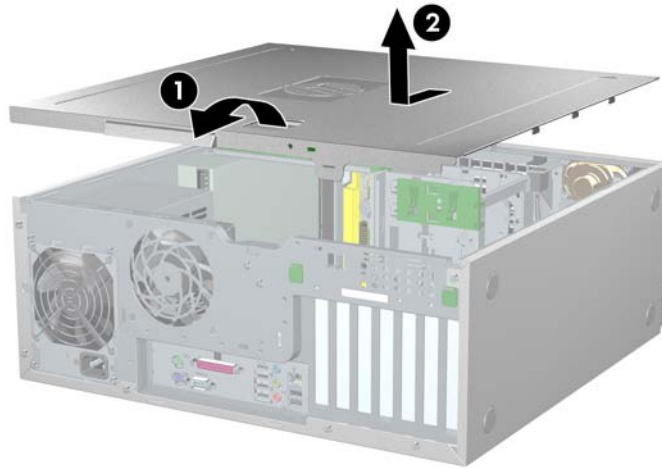
4.9 Access Panel

Before accessing the internal components of the workstation, the access panel must be removed.

To open the access panel:

⚠ WARNING! Before removing the workstation access panel, be sure that the workstation is turned off and that the power cord is disconnected from the electrical outlet.

1. Disconnect power from the system ([section 4.2](#)) and lay the workstation on its side as shown.
2. Pull up on the latch **1**, slide the access panel **2** toward the rear of the workstation and then lift the access panel off.



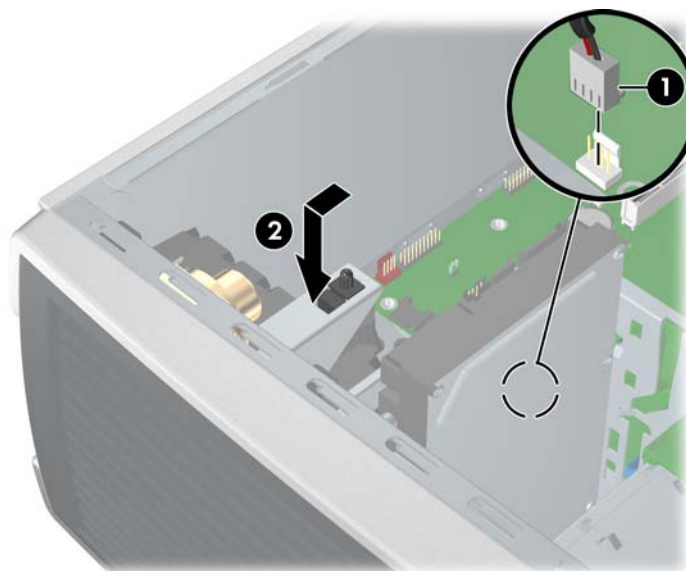
To replace the access panel, lay it flat on the unit about one inch from the bezel. The hooks should fall into the recesses. Then, slide the cover toward the bezel until it snaps into place.

4.10 Hood Sensor

To remove the hood sensor:

1. Disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).
2. Disconnect the hood sensor connector **1** from the system board.
3. Slide the hood sensor forward, push it down, and remove it **2** from the chassis.

⚠ CAUTION: Be careful when sliding the hood sensor forward. The hood sensor bracket and the chassis contain sharp edges that present a safety hazard.



To replace the hood sensor, reverse the previous steps.

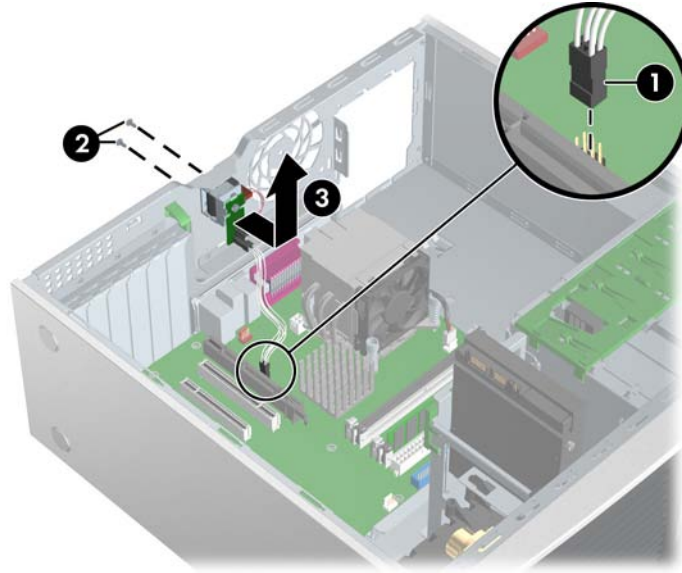
4.11 Solenoid Hood (Smart Cover) Lock (Optional)

To remove the solenoid lock:

1. Disconnect power from the system (section 4.2) and open the access panel (section 4.9).
2. Disconnect the solenoid hood lock cable ❶ from the system board.
3. Using the FailSafe key (T-15 wrench), unscrew the two screws ❷ from the back of the chassis as shown in the following diagram.

To purchase a FailSafe key, contact your authorized HP reseller or service provider or visit the HP Web site (<http://www.hp.com>) for ordering information.

4. Slide the solenoid hood lock assembly ❸ away from the chassis and out of the unit.

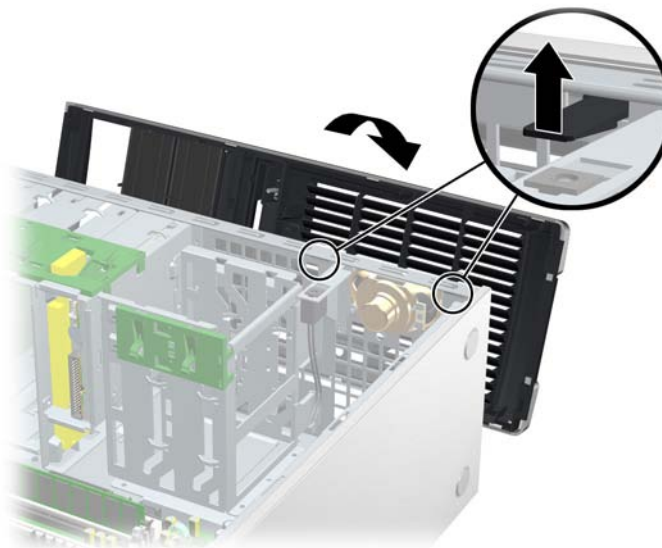


To replace the solenoid hood lock assembly, reverse the previous steps.

4.12 Front Bezel

To remove the front bezel:

1. Disconnect power from the system (section 4.2) and open the access panel (section 4.9).
2. Lift up on the two tabs ❶ located on the front bezel.
3. Rotate the front bezel away ❷ from the chassis and remove the bezel.

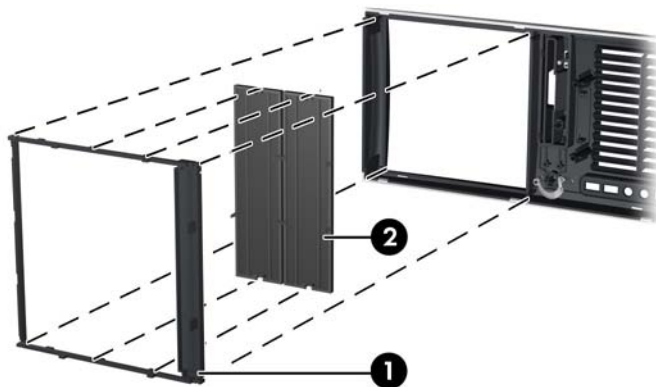


To replace the front bezel, reverse the previous steps.

4.13 Bezel Blanks

To remove the bezel blank:

1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)), and remove the front bezel ([section 4.12](#)).
2. Gently push the subpanel ❶ out the back of the front bezel.
3. Remove the desired bezel blank by applying outward pressure on the subpanel ❶ and pulling the blank ❷ away.



NOTE: The bezel blanks are keyed to assist you in replacing the blanks. Also, the subpanel can be rotated 90 degrees to install the optical drives in desktop orientation, if desired.

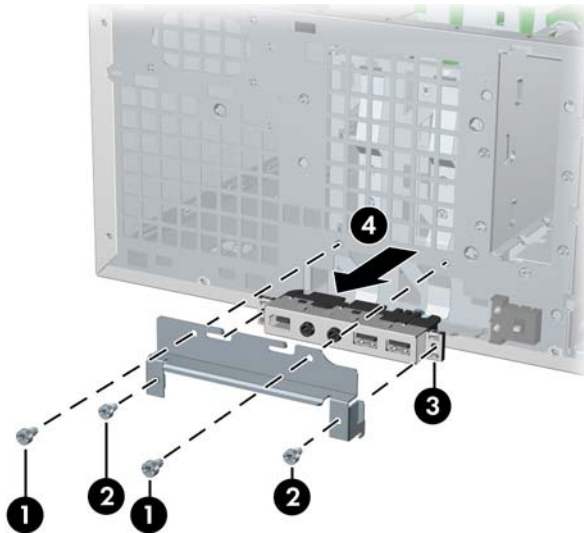
4.14 Front Panel I/O Device Assembly

To remove the front panel I/O device assembly:

1. Disconnect power from the system (section 4.2), open the access panel (section 4.9), and remove the front bezel (section 4.12).
2. Unlatch the plastic snap that secures the cables inside the chassis and disconnect the front panel I/O device assembly cables from the system board.
3. Remove the two smaller Torx screws ❶ that hold the front panel I/O device assembly ❸ and bracket to the chassis.
4. Remove the two larger Torx screws ❷ that hold the front panel I/O device assembly ❸ to the bracket.
5. Separate the bracket away from the front panel I/O device assembly.

⚠ **WARNING!** The next step requires the removal of cables through the chassis. Some edges on the chassis might be sharp. Be careful when removing these cables.

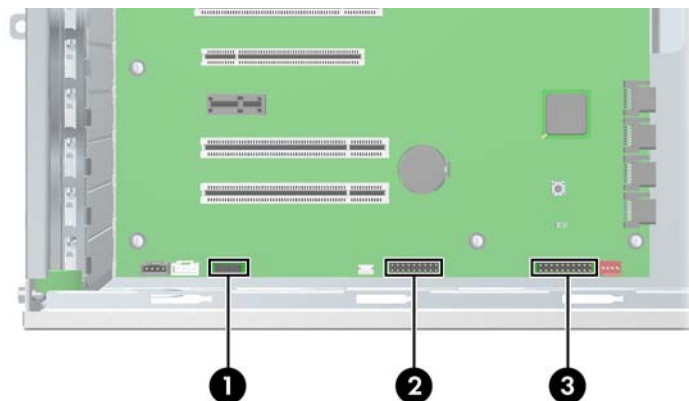
6. Pull the front panel I/O device assembly out about two inches away ❹ from the chassis.
7. Pull the front panel cables through the chassis and out the front of the unit. You might have to slide the cables out one at a time.



To replace the front panel I/O device assembly:

⚠ **WARNING!** The next step requires threading cables through the chassis. Some edges on the chassis might be sharp. Be careful when installing these cables.

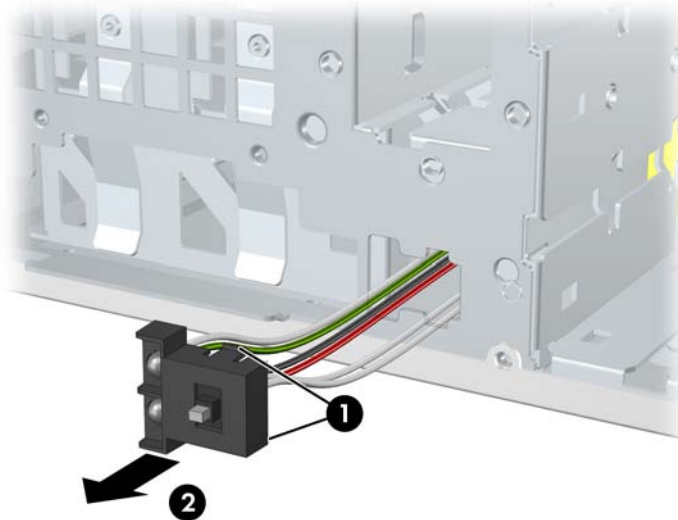
1. Thread each front panel I/O device assembly cable through the same holes from which they were removed.
2. Push the front panel I/O device assembly in to the chassis. Using your fingers, orient the cables so that there is enough room for the front panel I/O device assembly to easily fit in its slot.
3. Loosely put the bracket on the front panel I/O device assembly and hook the bracket to the chassis.
4. Screw the bracket to the front panel I/O device assembly and screw the bracket to the chassis.
5. Connect the front audio cable to ❶. Connect the front USB cable to ❷. Connect the front control panel cable to ❸. If an IEEE-1394 card is installed, connect the front IEEE-1394 cable to the card.



4.15 Power Button

To remove the power button:

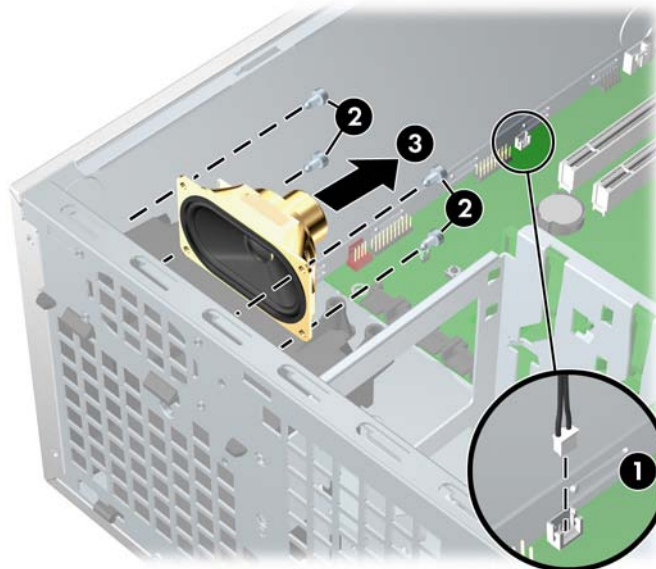
1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)), remove the front bezel ([section 4.12](#)), and remove the front panel I/O device assembly ([section 4.14](#)).
2. Disconnect the power button cable from the system board.
3. Press in on the clips that secure the power button to the chassis.
4. Dislodge the metal clip from the chassis by rocking the power button back and forth. Then slide the power button assembly ② out from the front of the chassis.



4.16 System Speaker

To remove the speaker:

1. Disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).
2. Disconnect the speaker cable ① from the system board.
3. Remove the four screws ② securing the speaker to the chassis and lift the speaker out of the chassis.



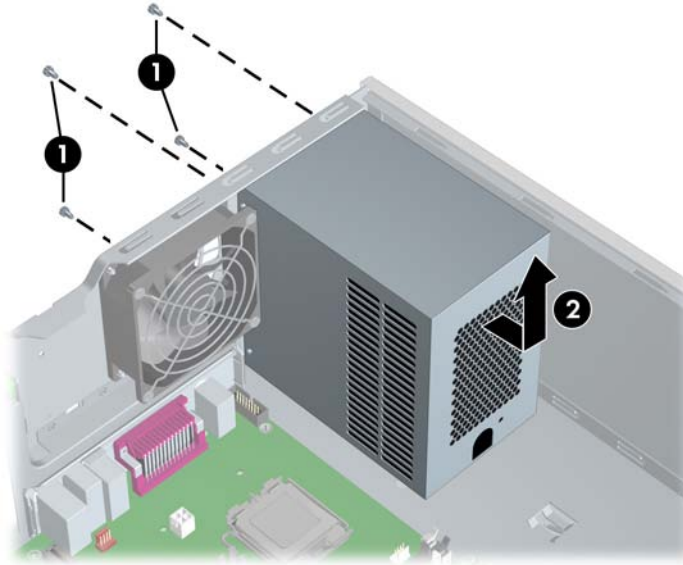
4.17 Power Supply

To remove the power supply:

1. Disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).

TIP: This next step requires disconnecting several power cables. To speed up reinstalling the power supply, it is helpful to write down the numbers on the cables so that you can easily reconnect the cable to the correct devices.

2. Disconnect all cables from the system board, drives, or cards.
3. Remove the four screws **1** from the back panel.
4. Slide the power supply toward the front and lift it **2** out of the chassis.

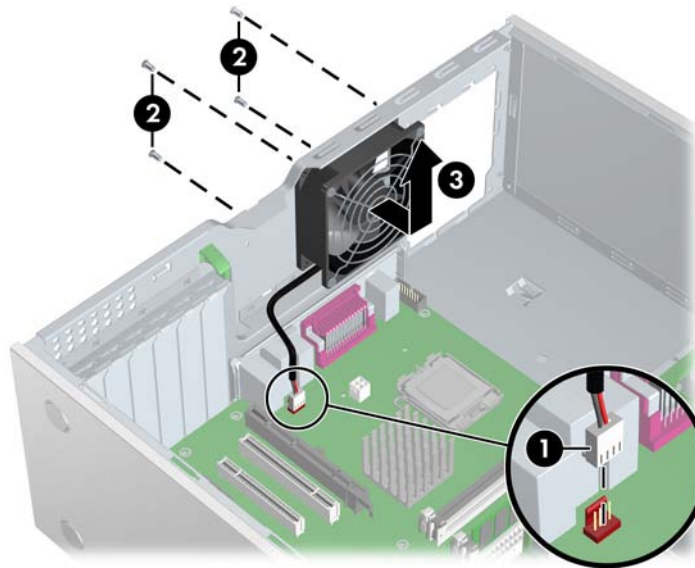


To replace the power supply, reverse the previous steps.

4.18 System Fan

To remove the system fan:

1. Disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).
2. Disconnect the fan plug ❶ from the system board.
3. Remove the four screws ❷ from the rear of the chassis with a Phillips screwdriver.



To replace the system fan, reverse the previous steps.

△ **CAUTION:** When replacing the system fan, be sure that the fan is situated so that the airflow direction arrow is pointing toward the rear of the chassis.

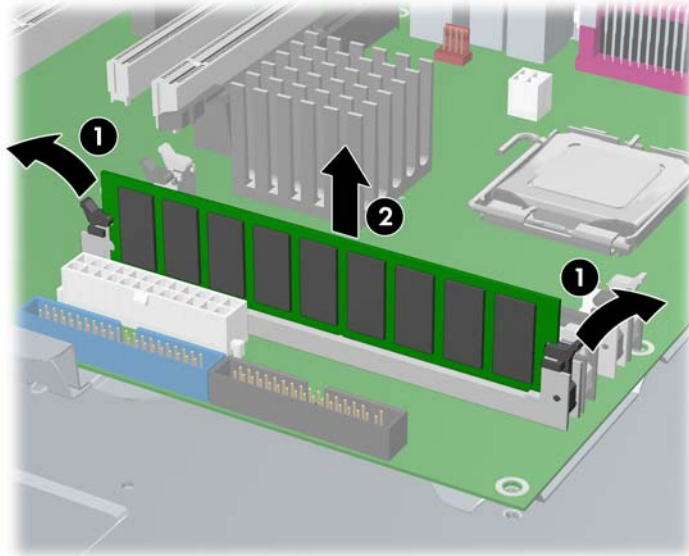
4.19 Memory

To remove a memory module:

1. Disconnect power from the system (section 4.2) and open the access panel (section 4.9).

△ **CAUTION:** To ensure that memory modules are not damaged during removal or installation, power off the workstation and unplug the power cord from the AC power outlet. Wait until the LED on the back of the power supply turns off before removing memory. If you do not unplug the power cord while installing memory, your memory modules might be damaged and the system will not recognize the memory changes.

2. Gently push outwards on the socket levers ❶.
3. Lift the DIMM ❷ straight up and remove it from the unit. Store the DIMM in an anti-static bag.



4.19.1 Memory Module Features

- Contains four memory slots for DIMMS
- Supports 256MB–4GB configurations
- Supports dual-channel DIMMs

4.19.2 Memory Module Requirements

△ **CAUTION:** HP only ships DIMMs that are electrically and thermally compatible with this product. Because third-party DIMMs might not be electrically or thermally compatible, they are not supported by HP.

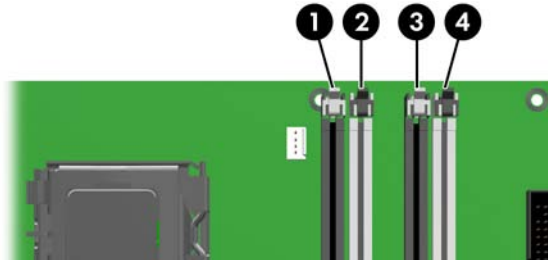
📝 **NOTE:** DIMMs and their sockets are keyed for proper installation. Be sure these guides line up when installing DIMMs.

- Use only industry-standard, unbuffered, PC2-4200 (533MHz) or PC2-5300 (667MHz) DIMMs
- Match DIMM pairs by size and type

4.19.3 Required Loading Order

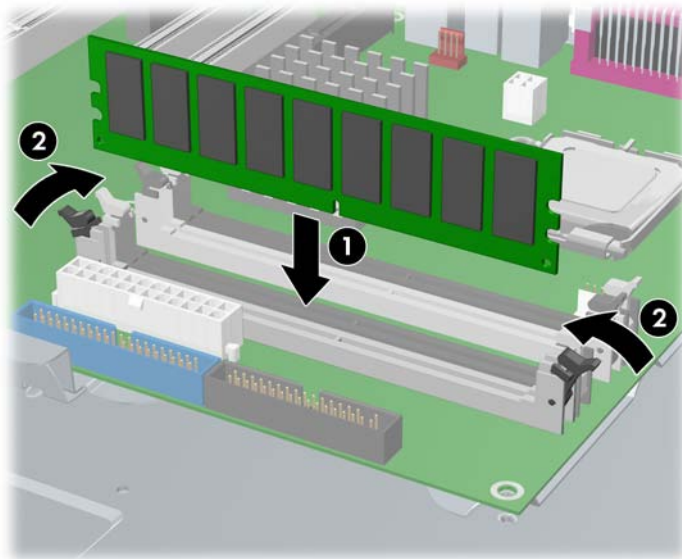
Use the following illustration as a guide for installing memory:

- If installing only one DIMM, install it in socket ❶.
- Install the first DIMM pair in sockets ❶ and ❸.
- Install the second DIMM pair in sockets ❷ and ❹.



To install a memory module:

1. Disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).
2. Gently push outwards on the socket levers.
3. Lower the DIMM straight down ❶ and secure the socket levers ❷ into place.



4.20 Peripheral Component Interconnect (PCI) Slots

The section contains information on the following topics:

- “PCI Slot Types” on page 69
- “PCI Card Support” on page 70
- “PCI Express” on page 71
- “PCI” on page 73

4.20.1 PCI Slot Types

Your workstation contains three PCI slots, one PCI Express x1 slots, one PCI Express x8' (x4), and a single PCI Express x16 slot (usually used for high-end graphics). The following table describes the slots, card types, and maximum slot power.



NOTE: Adjacent cards can have electromagnetic interactions with each other. As a practical matter, it is a good practice to physically separate high-speed cards from slower cards that may unintentionally couple some of their electromagnetic energy outside the box. Specifically, NIC cards should be located at least two slots away from graphics or SCSI controller cards, if possible, to minimize electromagnetic emissions.

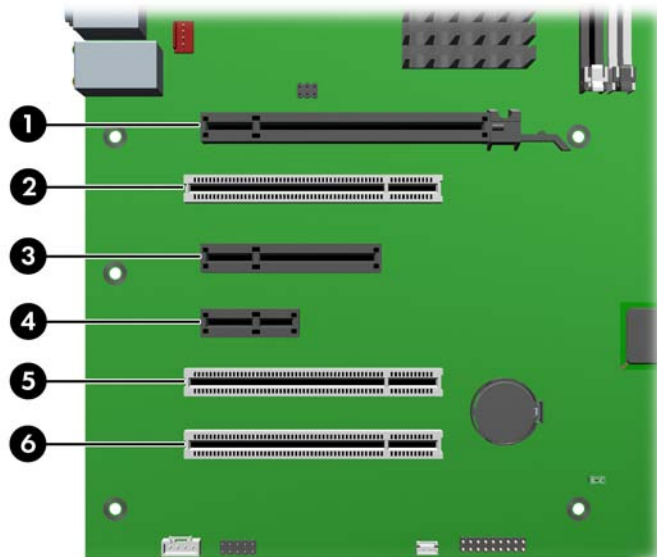


Table 4-9 PCI and PCI Express Slot Power Specifications

Slot#	Slot Type	Slot Power (Maximum)
❶	PCI Express x16 graphics	75W*
❷	PCI	25W*
❸	PCI Express x8' (x4)	25W*
❹	PCI Express x1	25W*
❺	PCI	25W*
❻	PCI	25W*

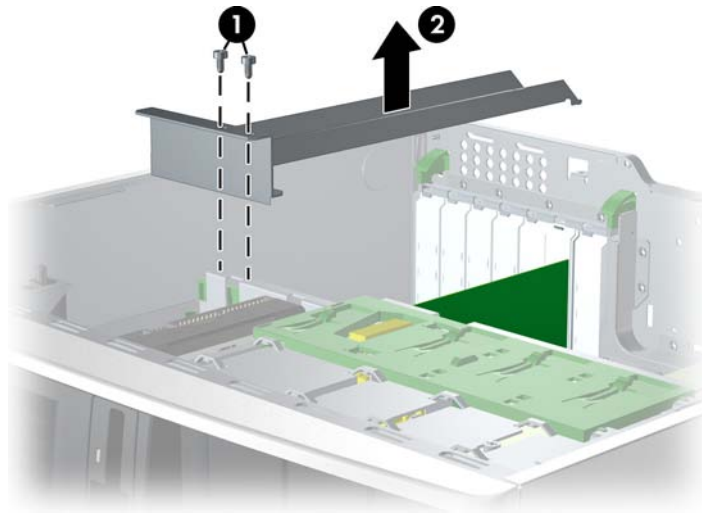
* In addition to these slot power specifications, the overall power consumption of the system (including I/O cards, processor, and memory) must not exceed the maximum ratings of the system power supply.

4.20.2 PCI Card Support

For added protection, some cards have PCI holders installed to prevent movement during shipping.

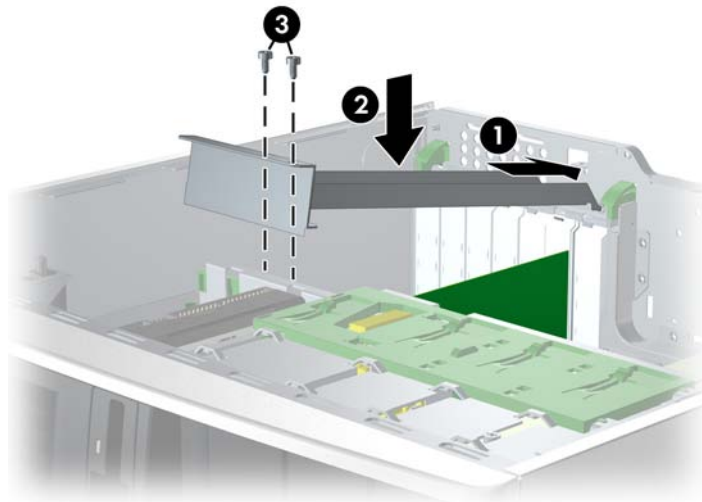
To remove the card support:

1. Disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).
2. Remove the two screws ❶ retaining the card support and lift ❷ it out of the chassis.



To install card support:

1. Disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).
2. Engage the rear bracket ❶ with the holes in the rear of the chassis before rotating it down ❷ into position.
3. Secure the bracket with two screws ❸.



4.20.3 PCI Express

PCI Express, a hardware interconnect standard (for example, I/O slots), is a point-to-point architecture and uses a serial data transmission protocol. A single PCI Express lane consists of four wires and is capable of transmitting 250MB in a single direction or 500MB in both directions simultaneously. This bandwidth is not affected by what is happening on other PCI Express buses or legacy PCI/PCI-X buses (provided that total bandwidth can be handled by the CPU and the memory subsystem). The transmission protocol is similar to what is used for a LAN connection and contains error correction and detection, packet addressing, and other network features.

PCI Express improves system attributes. PCI Express enables a low-power, scalable, high-bandwidth communication path with a small number of connections (wires) compared to traditional parallel interfaces (for example, PCI).

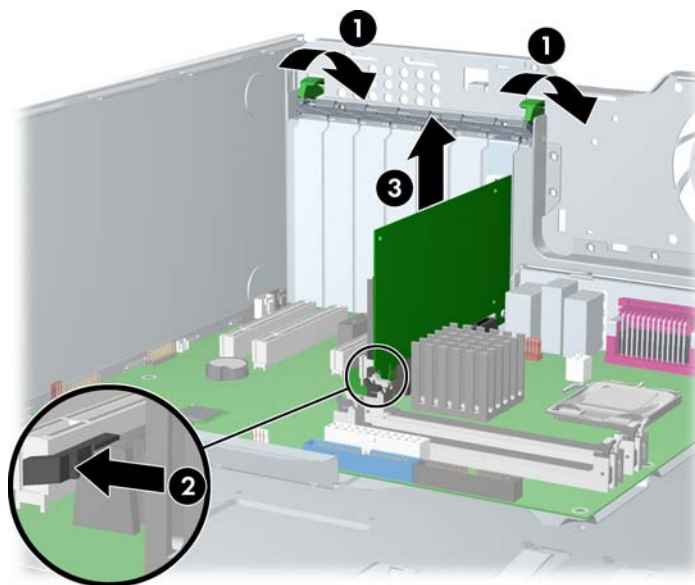
The PCI Express I/O slots can support other PCI Express cards with lesser bus bandwidth than what is physically defined for the slot. Use the following table to determine compatibility.

Table 4-10 PCI Express Compatibility Matrix for HP xw4300 Workstation

	Mechanical Compatibility	Electrical Compatibility
PCI Express x1 Slot	x1 cards	x1 modes
PCI Express x8' (x4) Slot	x1, x4, and x8 cards	x1 and x4 modes
PCI Express x16 Slot	x1, x4, x8, and x16 cards	x1 and x16 modes

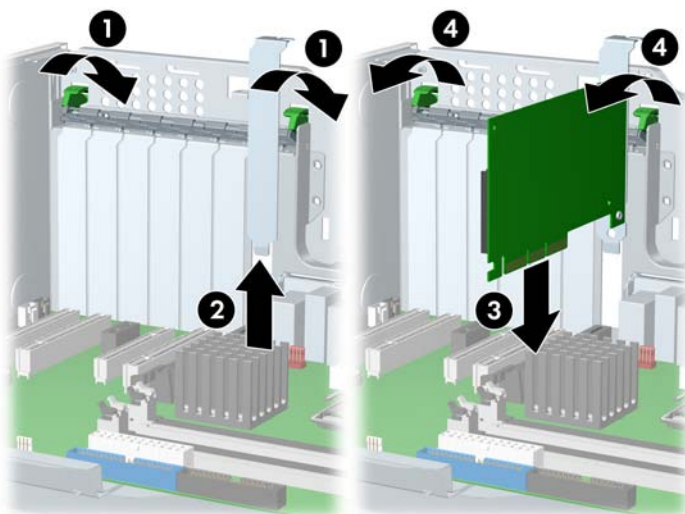
To remove a PCI Express card:

1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)) and remove the PCI card support ([section 4.20.2](#)), if installed.
2. Lift the PCI levers ❶ by first pressing down and then up.
3. If removing a PCI Express x16 graphics card, press in on the “hockey stick” lever ❷ while lifting the card ❸ out of the chassis. Store the card in an anti-static bag.
If removing another type of PCI Express card, lift the card out of the chassis. You do not need to press in on the “hockey stick” lever.
4. Install a PCI slot cover and close the PCI levers. If the PCI levers do not close, be sure all cards are properly seated and then try again.



To install a PCI Express card:

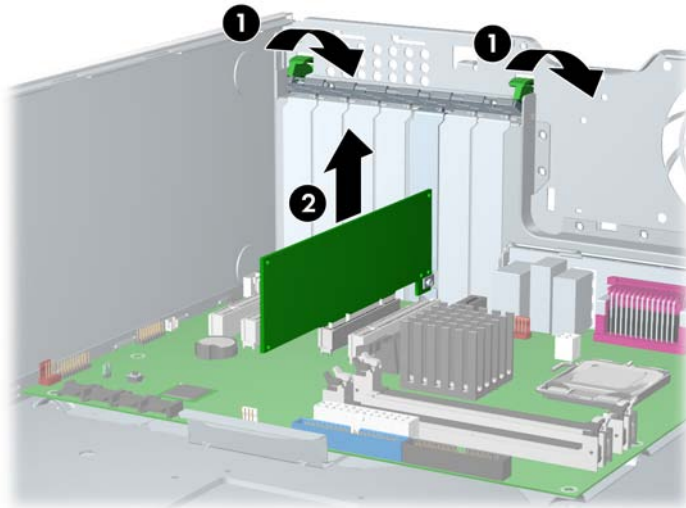
1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)) and remove the PCI card support ([section 4.20.2](#)), if installed.
2. Lift the PCI levers ❶ by first pressing down and then up.
3. Remove the PCI slot cover ❷.
4. Lower the PCI Express ❸ card into the chassis. Verify that the keyed components of the card align with the socket.
5. Close the PCI levers ❹. If the PCI levers do not close, be sure all cards are properly seated.



4.20.4 PCI

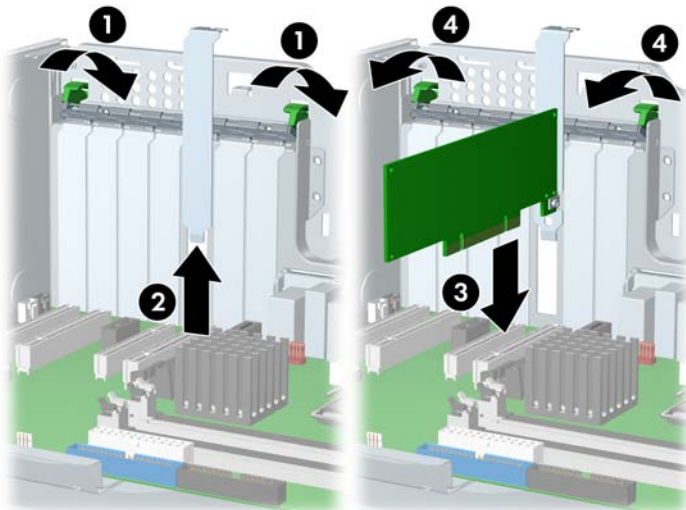
To remove a PCI card:

1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)) and remove the PCI card support ([section 4.20.2](#)), if installed.
2. Lift the PCI levers ❶ by first pressing down and then up.
3. Lift the PCI card ❷ out of the chassis. Store the card in an anti-static bag.
4. Install a PCI slot cover and close the PCI levers. If the PCI levers do not close, be sure all cards are properly seated and then try again.



To install a PCI card:

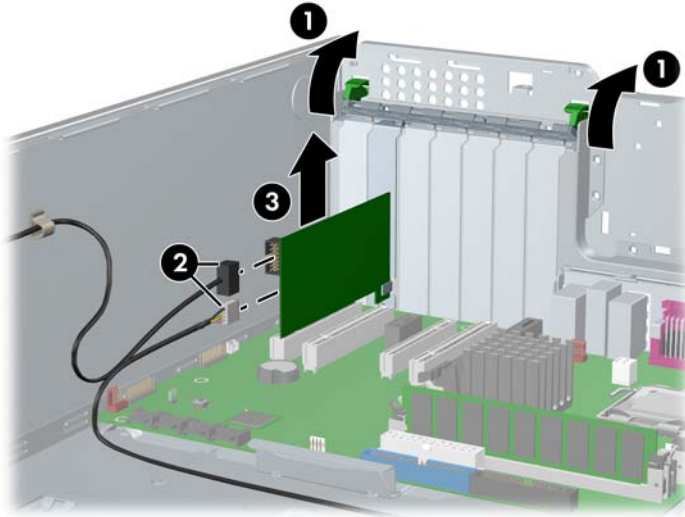
1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)) and remove the PCI card support ([section 4.20.2](#)), if installed.
2. Lift the PCI levers ❶ by first pressing down and then up.
3. Remove the PCI slot cover ❷.
4. Lower the PCI ❸ card into the chassis. Verify that the keyed components of the card align with the socket.
5. Close the PCI levers ❹. If the PCI levers do not close, be sure all cards are properly seated and then try again.



4.20.5 IEEE-1394 (Optional)

To remove an IEEE-1394 card:

1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)) and remove the PCI card support ([section 4.20.2](#)), if installed.
2. Lift the PCI levers ❶ by first pressing down and then up.
3. Disconnect the front I/O cable and power cable ❷ from the card.
4. Lift the IEEE card ❸ out of the chassis. Store the card in an anti-static bag.
5. Install a PCI slot cover and close the PCI levers. If the PCI levers do not close, be sure all cards are properly seated and then try again.

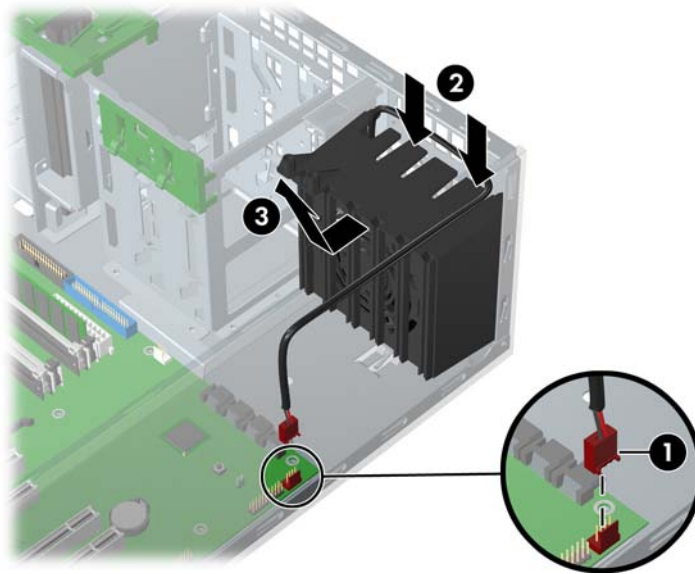


To install an IEEE-1394 card, reverse the previous steps.

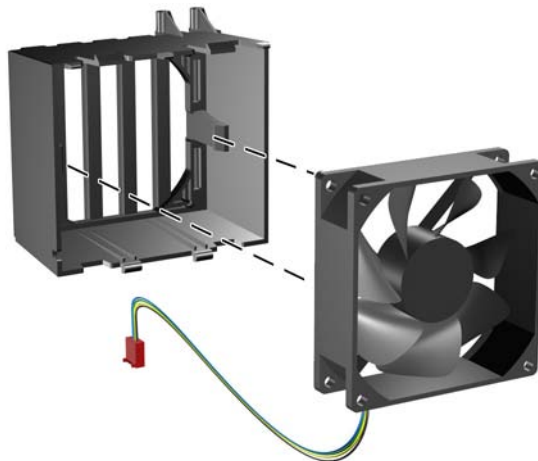
4.21 Front Fan (Optional)

To remove the front fan:

1. Disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).
2. Disconnect the header ❶ from the system board and thread it out of the card guide. Note that the system board connector refers to "PCI fan."
3. Unsnap the fan housing from the chassis ❷ and lift it ❸ out of the workstation.



4. Remove the fan from the fan housing by applying outward pressure on the fan housing while pushing the fan out of the housing.



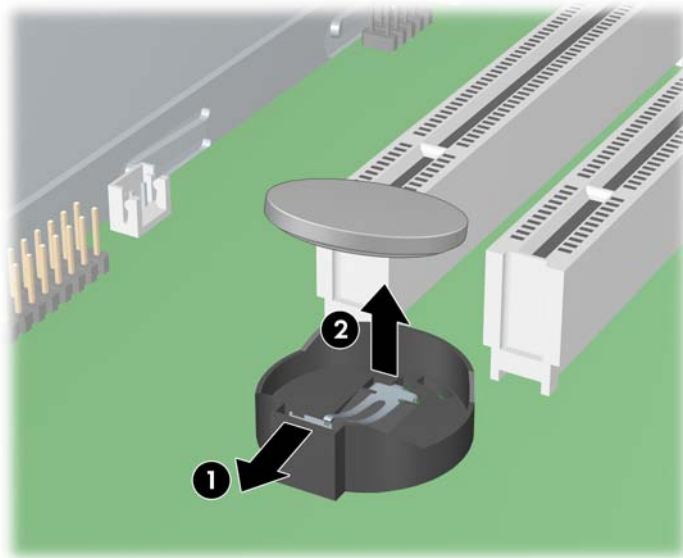
To replace the front fan, reverse the previous steps, but be sure that the airflow direction arrow on the side of the fan points to the rear of the chassis.

4.22 Battery

△ **CAUTION:** Before removing the battery, be sure your Complementary Metal Oxide Semiconductor (CMOS) settings are backed up because all CMOS settings are lost when the battery is removed. To back up the CMOS settings, use Computer Setup and run the Save to Diskette option from the File menu.

To remove the battery:

1. Disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).
2. On the system board, press on the release tab of the battery holder ❶.
3. Lift the battery straight up ❷.



To replace the battery, slide the battery back in until it snaps back into place.

4.23 Power Connections

For help in identifying power cables, refer to the following information. Route or tie cables so that there is no possible way for them to interfere with the CPU heatsink fan.

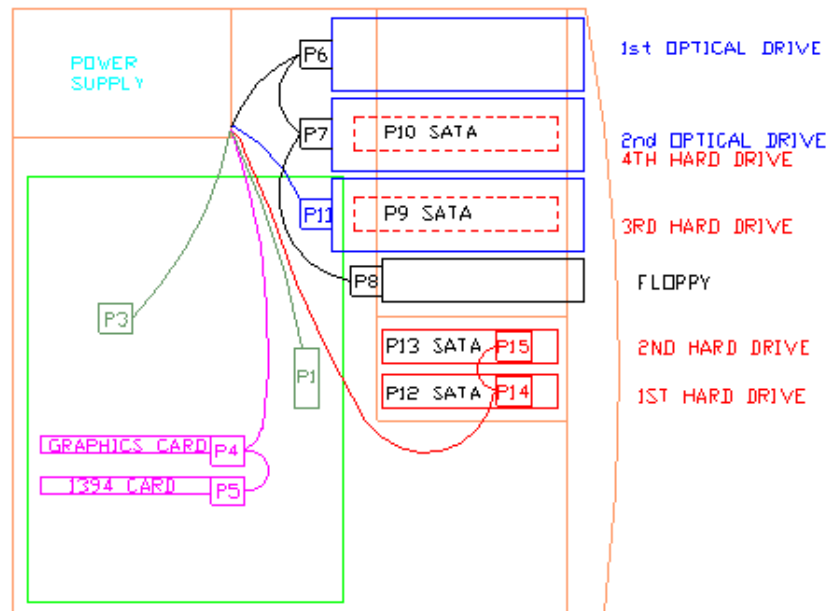



Table 4-11 Power Connections

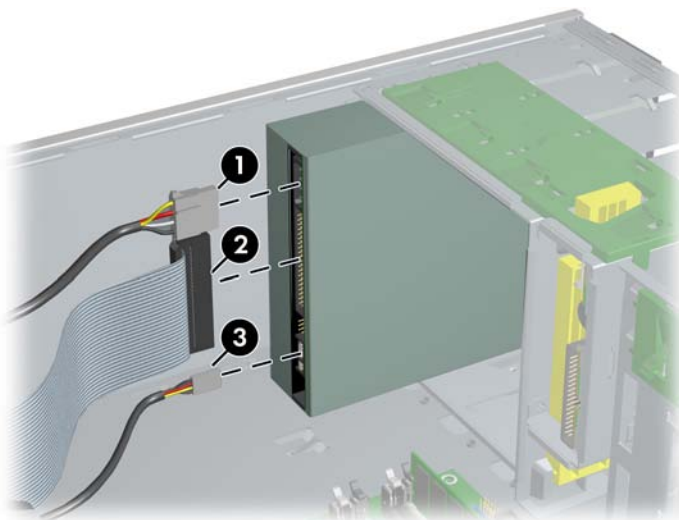
P1	Main power on system board
P2	N/A
P3	CPU power
P4	PCI Express graphics auxiliary
P5	PCI (e.g. 1394) auxiliary
P6	ODD IDE top bay
P7	ODD IDE mid bay
P8	FDD
P9	3rd HDD SATA bottom ODD bay
P10	4th HDD SATA mid ODD bay
P11	ODD IDE or 3rd HDD SCSI ODD bottom bay
P12	1st HDD SATA bottom HDD bay
P13	2nd HDD SATA top HDD bay
P14	1st HDD SCSI bottom HDD bay
P15	2nd HDD SCSI top HDD bay

4.24 Optical Drive (Minitower Position)

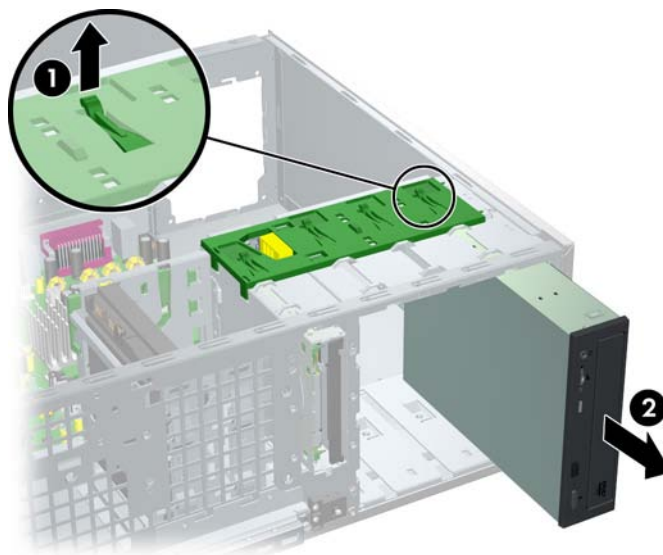
To remove an optical drive:

1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)), and remove the front bezel ([section 4.12](#)).
2. Disconnect the power ❶, data ❷, and audio ❸ cables from the drive. The connector colors might be different than illustrated.

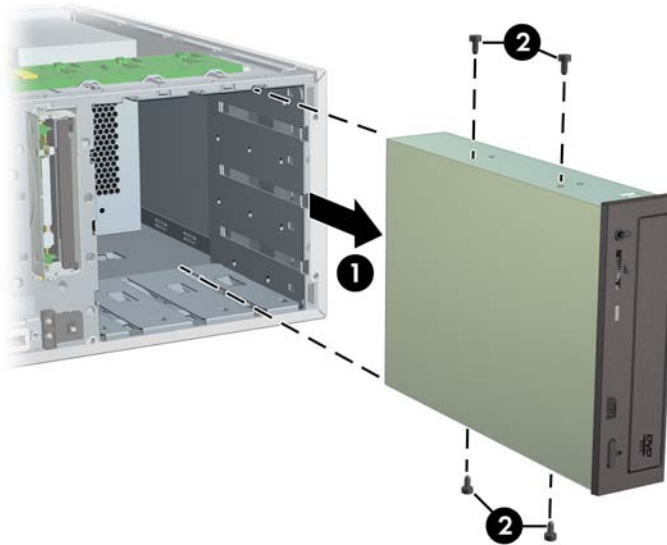
 **NOTE:** The audio cable is only required for Linux-based systems.



3. Lift the green drivelock release lever ❶ and gently slide the drive ❷ out of the chassis.



4. After pulling the drive ❶ out, remove the four guide screws ❷ from the drive. Only remove the four guide screws if you plan to install another drive.



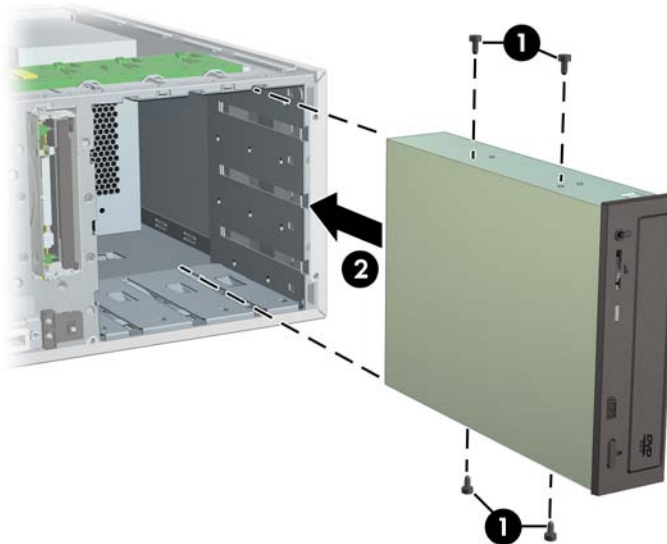
To install an optical drive:

1. Disconnect power from the system (section 4.2), open the access panel (section 4.9), remove the front bezel (section 4.12), and remove a bezel blank (section 4.13), if necessary.
2. Insert the four guide screws ❶ into the drive.
3. Align the screws with the grooves in the drive bay and gently slide ❷ the drive into the unit until it snaps into place.

△ **CAUTION:** Ensure that the optical drive is secure by pulling to see if the drive can become easily disengaged. Failure to do so can cause damage to the drive when moving the workstation.

4. Connect the power, drive, and audio (if required) cables to the drive and system board. On Linux systems, connect the audio cable to the AUX-IN connector.


📝 **NOTE:** The audio cable is only required for Linux-based systems.

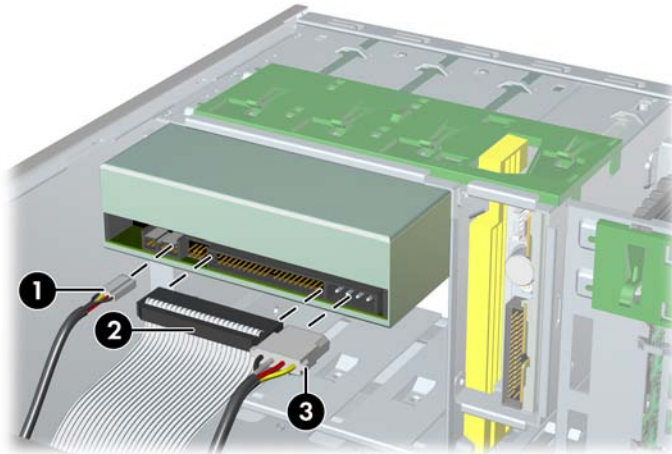


4.25 Optical Drive (Desktop Position)

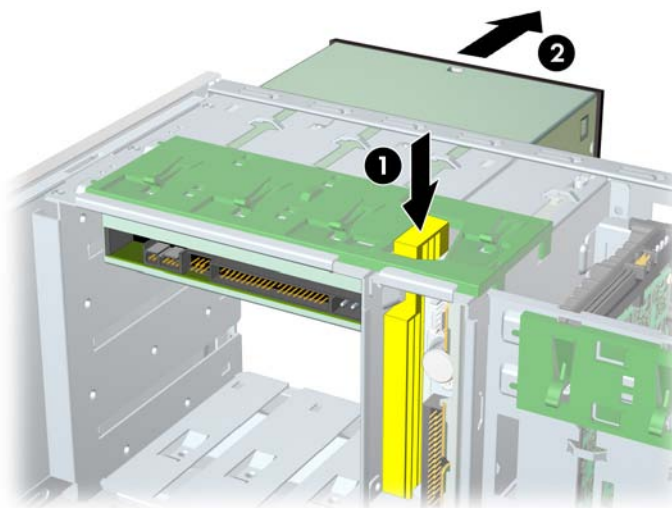
To remove an optical drive:

1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)), and remove the front bezel ([section 4.12](#)).
2. Disconnect the audio ❶, data ❷, and power ❸ cables from the drive. The connector colors might be different than illustrated.

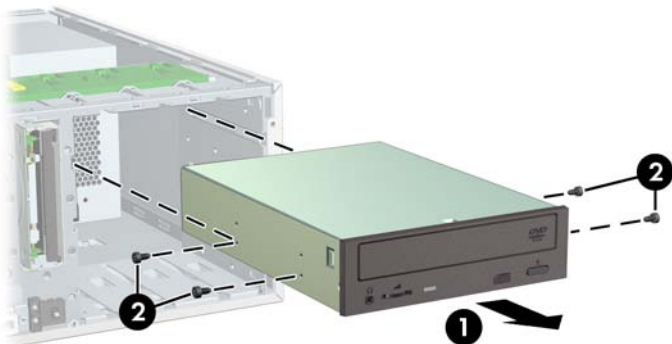
 **NOTE:** The audio cable is only required for Linux-based systems.



3. Press down on the yellow drivelock release lever ❶ and gently slide the drive ❷ out of the chassis.



4. After pulling the drive ❶ out, remove the four guide screws ❷ from the drive as shown in the illustration below. Only remove the four guide screws if you plan to install another drive.



To install an optical drive:

1. Remove the front bezel and bezel blanks.
2. Insert the four guide screws into the drive.

3. Align the screws with the slots on the drive and slide the drive into the unit until it snaps into place.

△ **CAUTION:** Ensure that the optical drive is secure by pulling to see if the drive can become easily disengaged. Failure to do so can cause damage to the drive when moving the workstation.

4. Connect the power, drive, and audio (if required) cables to the drive and system board. On Linux systems, connect the audio cable to the AUX-IN connector.

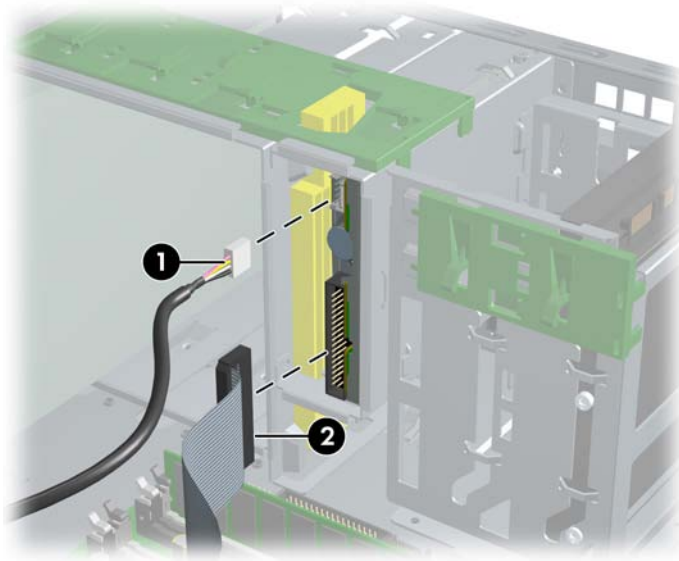
📝 **NOTE:** The audio cable is only required for Linux-based systems.



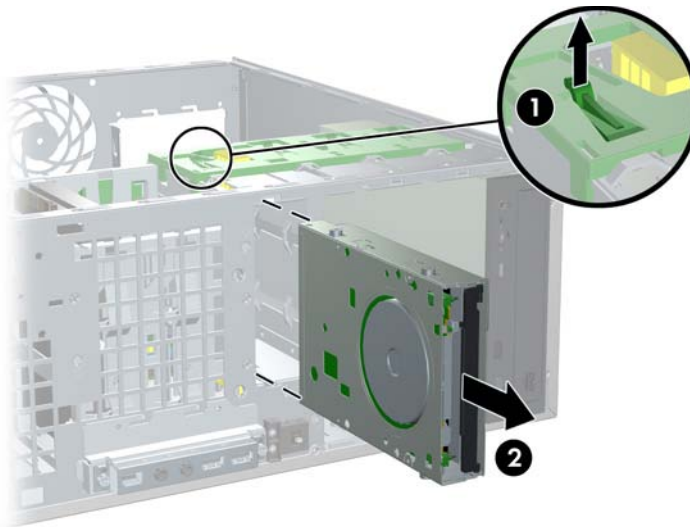
4.26 Diskette Drive

To remove a diskette drive:

1. Disconnect power from the system (section 4.2), open the access panel (section 4.9), and remove the front bezel (section 4.12).
2. Disconnect the data ❶ and power ❷ cables from the back of the diskette drive.



3. Lift the green drivelock release tab ❶ and gently slide the drive ❷ out at the same time.



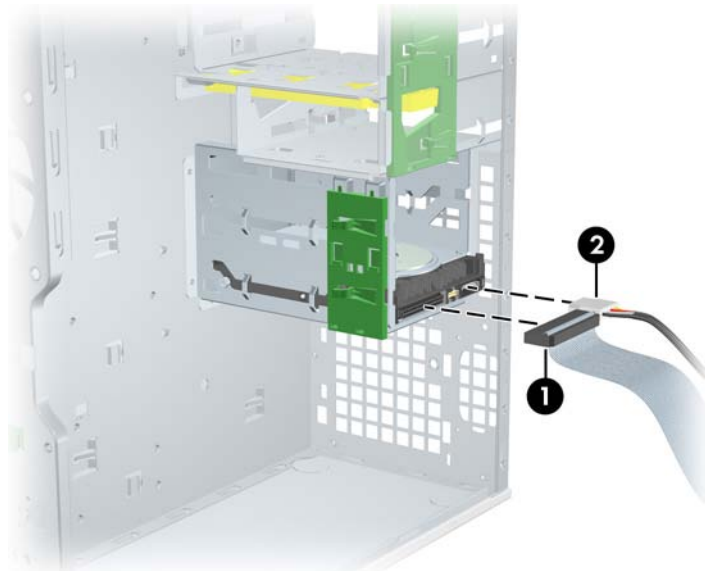
To replace a diskette drive:

1. Align the metal protrusions on the side of the drive with the grooves in the diskette drive bay and slide the diskette drive into the bay until it stops.
2. Connect the data cable to the diskette drive ❶ and to the system board ❷.
3. Connect the power cable to the diskette drive.

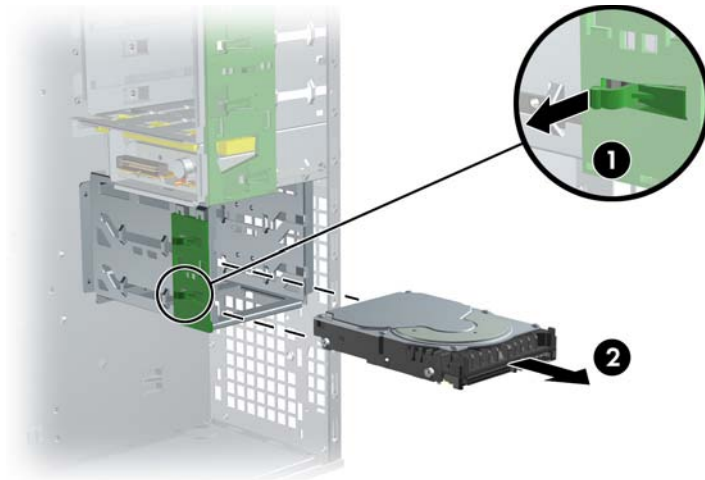
4.27 SCSI Hard Disk Drive

To remove a hard drive:

1. Disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).
2. Disconnect the data ❶ and power ❷ cables from the hard drive.



3. Lift up on the green drivelock release tab ❶ and slide the hard drive ❷ out of the chassis.



To install a SCSI hard drive:

For more information on SCSI hard drives, see [“SCSI Devices” on page 127](#).

Before installing a SCSI hard drive on your system, you must give the hard drive a unique SCSI ID.

All SCSI controllers require a unique SCSI ID (0–15) for each SCSI device that is installed. The reserved and available SCSI ID numbers are displayed in the following list:

- 0 is reserved for the primary hard drive (not reserved for the primary hard drive on Linux).
- 7 is reserved for the SCSI controller.
- 1 through 6 and 8 through 15 are available for all other SCSI devices.

When 0 is used for the primary hard drive, set the second hard drive to 1, the third to 2, and so on.

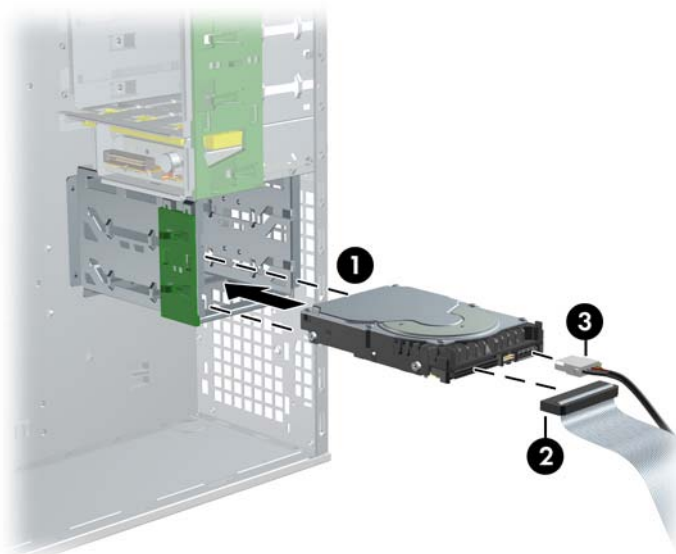
To set the SCSI ID on a drive, see the instructions on top/back of the hard drive for the correct jumper settings. The drive probably displays a diagram of the jumper block. This diagram shows you which blocks to cover with your jumper to get the desired ID.

For example, if the drive must be set to 3, the drive might show that the 4 ID bits are at the far left of the connector (ID0, ID1, ID2, and ID3), then using the jumpers provided, cover the pins to set the SCSI ID.

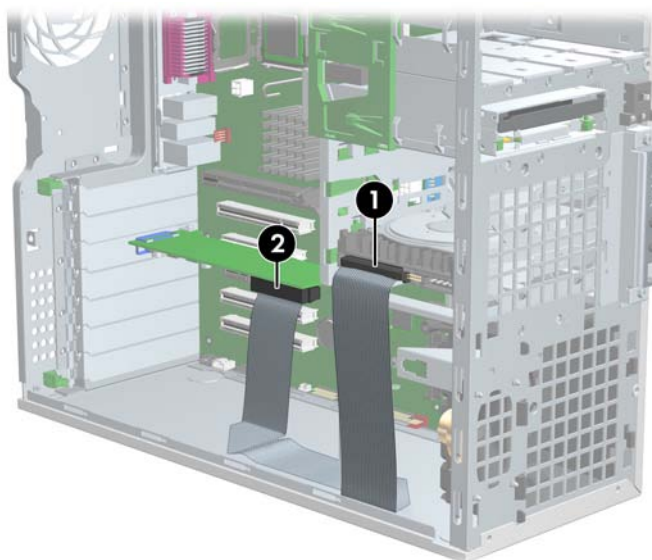
After you have given the hard drive a unique SCSI ID, you can install the hard drive into your system.

1. Disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).

2. Select a drive bay in which to install the drive.
3. Push the drive ❶ into the selected bay until it snaps into place.
4. Attach the data ❷ and power ❸ cables to the drive.



5. Insert the SCSI controller card into an available PCI slot ([section 4.20.4](#)).
6. Connect the data cable from the hard drive ❶ to the controller card ❷.
7. Connect the hard drive LED cable from the card to the hard drive LED connector on the system board. You can find the location of this connector on the illustration on the inside of the access panel.

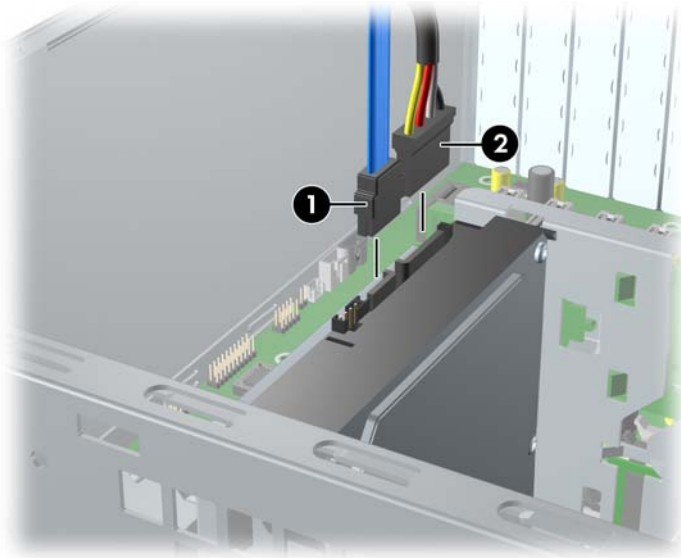


4.28 SATA Hard Drive

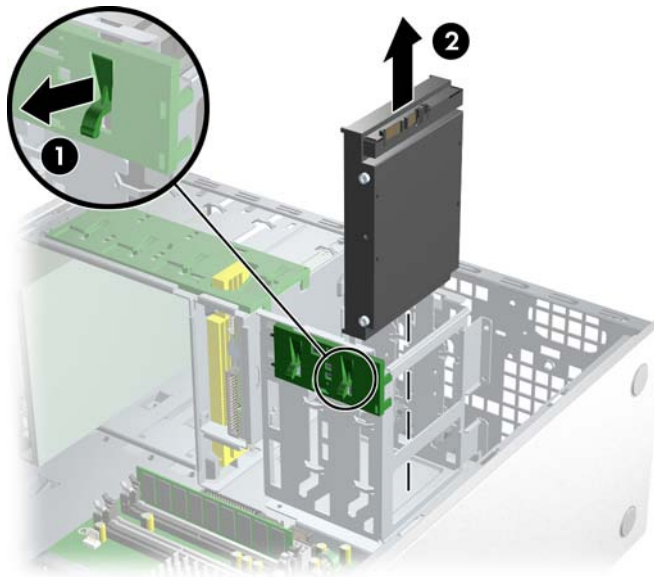
For more information on SATA hard drives and the SATA RAID configuration, see “SATA Devices” on page 125.

To remove a SATA hard drive:

1. Disconnect power from the system (section 4.2) and open the access panel (section 4.9).
2. Disconnect the data ① and power ② cables from the hard drive.

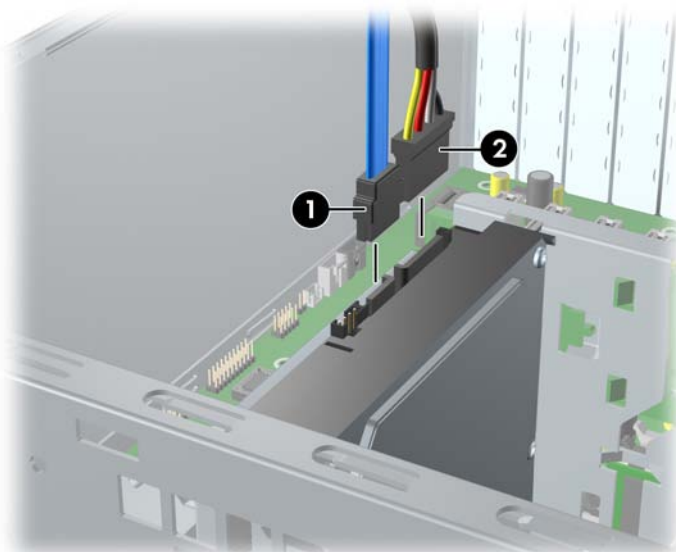


3. Lift up on the green drive-lock release tab ① and slide the hard drive ② out of the chassis.

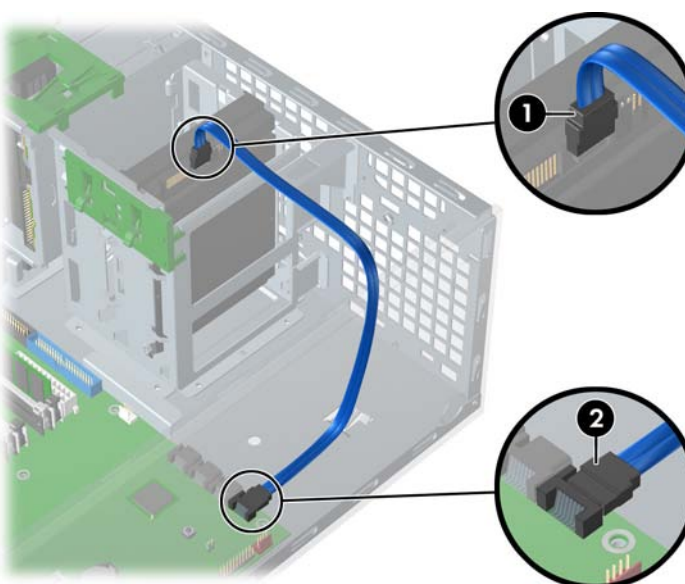


To install **one to two** SATA drives:

1. Disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).
2. Select a drive bay in which to install the drive.
3. Push the drive into the selected bay until it snaps into place.
4. Connect the data cable ❶ and power cable ❷ to the hard drive.




5. Connect the data cable ❶ from the hard drive to the serial ATA port ❷. SATA0 port is shown in the following illustration.
 - Connect SATA 0 to SATA0 (P60).
 - Connect SATA 1 to SATA1 (P61).



To install **three to four** SATA hard drives:

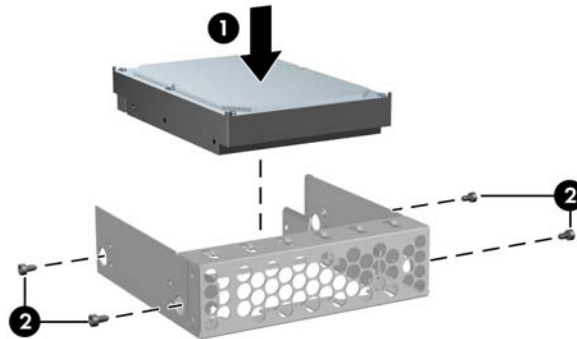
1. Follow the instructions for installing two SATA hard drives ([page 86](#)).
2. Follow the instructions for installing the hard drive into the optical drive slot ([page 87](#)).

 **NOTE:** If installing three SATA hard drives, you must install hard drives in at least one optical drive bay. If installing four SATA hard drives, you must install hard drives in at least two optical drive bays.

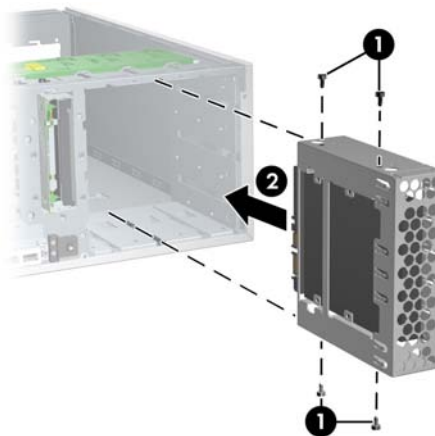
3. Attach the power and data cable to the drive.
 - Connect SATA 2 to SATA2 (P62).
 - Connect SATA 3 to SATA3 (P63).

4.28.1 Installing Hard Drives in the Optical Drive Bay (Optional)

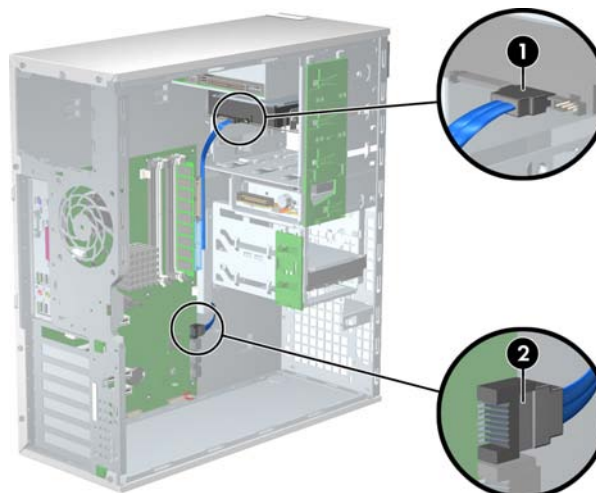
1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)), and remove the front bezel ([section 4.12](#)).
2. Place the hard drive in the bracket **1** and secure with American National screws **2** as shown in the following illustration.




3. Screw four screws to the bracket **1**. Align the screws with the grooves in the optical drive bay and slide the drive in **2** the chassis.



4. Connect the data cable to the hard drive **1** and to the system board **2**. SATA installation is shown.
5. Connect the power cables (not shown).





4.29 CPU Heatsink

 **CAUTION:** Different versions of the CPU heatsink exist, but the overall procedures listed are sufficient to assist you in removing the heatsink.

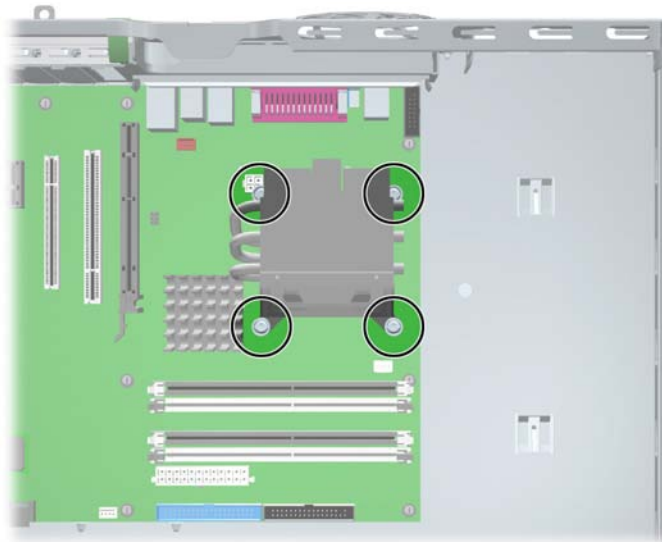
To remove the CPU heatsink:

1. Turn on the workstation and enter Computer Setup (F10) ([section 3.1](#)). Let the workstation run in this mode for five minutes.
This action warms the thermal interface material between the CPU heatsink and processor so that the thermal bond loosens and can more easily be broken.

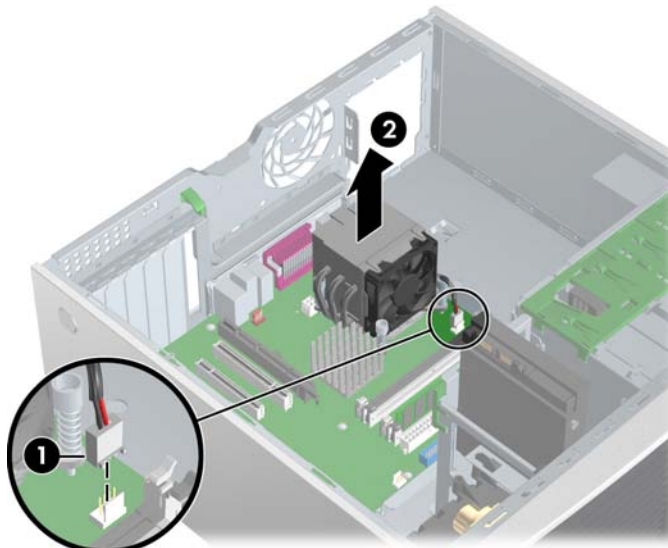
 **CAUTION:** Removing the CPU heatsink while the thermal compound is cold puts unnecessary mechanical stress on the CPU and the CPU socket. This action could damage the processor and the processor socket.

 **NOTE:** Windows in idle state does not provide sufficient heat to warm the compound.

2. After warming the thermal interface, shut down the system, disconnect power from the system ([section 4.2](#)) and open the access panel ([section 4.9](#)).
3. Loosen the captured heatsink screws from the system board in pairs. Begin by slightly loosening any two screws that are diagonally opposite from one another, then slightly loosen the other two. Then finish removing the screws.



4. Gently twist the heatsink unit to break the thermal grease binding.
5. Disconnect the CPU heatsink cable ❶ from the system board.
6. Lift the CPU heatsink ❷ unit.



7. Use alcohol and a soft cloth to clean all the thermal interface material residue from the CPU heatsink and processor.

△ **CAUTION:** Allow the alcohol on the processor and CPU heatsink to dry completely.

8. Use alcohol and a soft cloth to clean all of the thermal interface material residue from the CPU heatsink and processor.

To replace the CPU heatsink:

1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)), and remove the CPU heatsink ([section 4.29](#)).
2. Use alcohol and a soft cloth to clean all of the thermal interface material residue from the CPU heatsink and processor.

△ **CAUTION:** Allow the alcohol on the processor and CPU heatsink to dry completely.

3. Check for proper processor seating in the socket by carefully trying to lift the processor out of the socket with your fingers. A properly seated processor does not lift out of the socket.
4. Apply thermal grease to center of the processor. If using a new CPU heatsink, remove and discard the thermal grease protective liner from the bottom of the new CPU heatsink.

 **NOTE:** Do not touch the exposed thermal grease when handling the CPU heatsink.

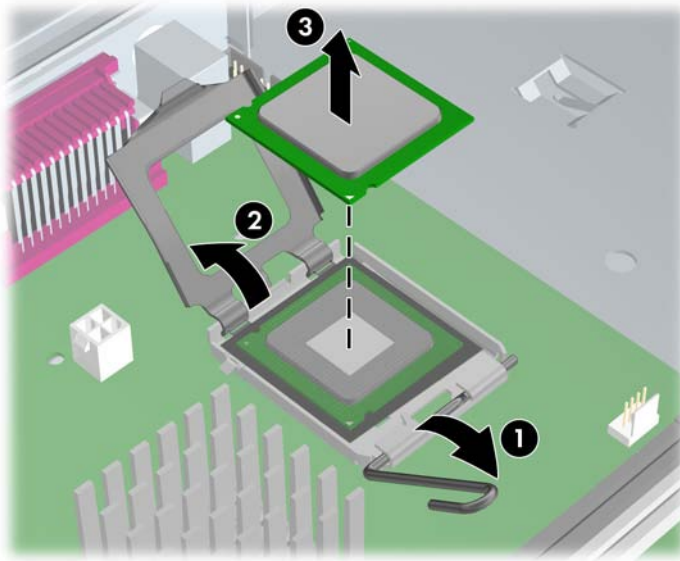
5. Lower the CPU heatsink onto the system board.
6. Carefully tighten the four screws a little at a time; do not fully tighten one screw and move onto the next. Be sure the processor remains level and be sure you do not overtighten the screws. If you have a torque-limited driver available, tighten the screws to the correct torque setting of 6 in-lbs.

△ **CAUTION:** Do NOT overtighten the screws. If you overtighten the screws, you risk stripping the threads in the system board tray.

4.30 Processor

To remove the processor:

1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)), and remove the CPU heatsink ([section 4.29](#)).
2. Raise the lever ❶ on the processor socket handle and open the cover ❷.
3. Pull the processor ❸ straight out of the socket.



△ **CAUTION:** Avoid bending the protrusions in the CPU socket. This mishandling can damage the CPU socket.

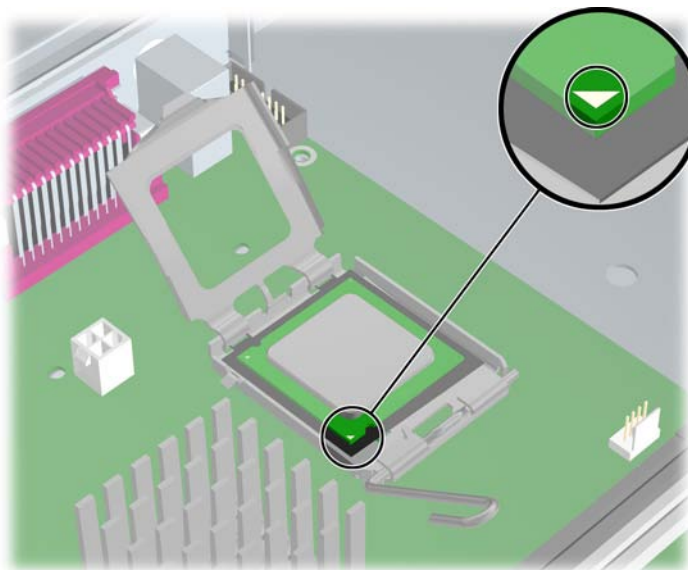
📝 **NOTE:** Store the processor in a safe place where it will not be damaged.

To replace the processor:

1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)), remove the CPU heatsink ([section 4.29](#)), and remove the processor ([section 4.30](#)).
2. Raise the processor socket handle fully (the full swing angle of the lever is approximately 90 degrees).

△ **CAUTION:** Processor pins are delicate and bend easily. Use extreme care when placing the processor in the socket.

3. Line up the triangle on the top of the processor with the triangle on the corner of the processor socket and install the processor into the socket. Ensure that the underside of the processor is level with the top of the processor socket. Lightly press down on the top of the processor while closing the socket lever.




4. Check for proper processor seating in the socket by carefully trying to lift the processor out of the socket with your fingers. A properly seated processor does not lift out of the socket.
5. Replace the CPU heatsink ([section 4.29](#)).

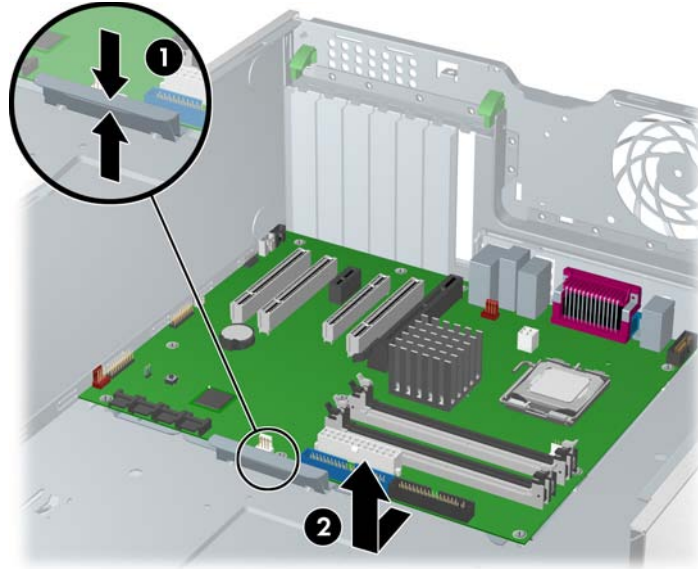
4.31 System Board

To remove the system board:

1. Disconnect power from the system ([section 4.2](#)), open the access panel ([section 4.9](#)), remove all plug-in cards and graphics cards ([section 4.19](#)), and remove the system fan assembly ([section 4.18](#)).
2. Disconnect all cabling from the system board.

 **NOTE:** Make note of the cable connections before disconnecting them from the system board. Refer to [section 4.23](#) "Power Connections" for more information.

3. Press the release tab as shown in the following illustration.
4. Slide the board toward the front of the chassis and then lift it out of the unit.



To replace the system board:

1. Lay the system board back in the chassis slightly away from the rear of the chassis. The mounting hooks should fall into the recesses of the tray so the tray lays flat on the chassis base.

 **NOTE:** Be sure the system board connectors engage correctly with the rear I/O panel.

2. Slide the tray towards the rear of the chassis until the heat sink mounting holes line up.
3. Re-install the heatsink, cards, and cables

5 System Diagnostics and Troubleshooting

This chapter discusses the tools available for diagnosing and troubleshooting system issues.

- Section 5.1 “Help & Support Center (HSC) and E-Support”
- Section 5.2 “Troubleshooting Checklist”
- Section 5.3 “LED Color Definitions”
- Section 5.4 “HP Insight Diagnostics Offline Edition”
- Section 5.5 “Troubleshooting Using HP Intelligent Manageability Features”
- Section 5.6 “Diagnostic Light Codes”
- Section 5.7 “Troubleshooting Scenarios and Solutions”
- Section 5.8 “Power On Self Test (POST) and Error Messages”

5.1 Help & Support Center (HSC) and E-Support

HSC provides online access to technical support information, software updates and downloads, diagnostic tools, and HP support contact information.

To open HSC from your desktop, click **Start > Help and Support**.

HSC contains four sections:

- HP Product Information (requires Internet access)—Links to the HP Technical Support Web site for your product. You can access all related documentation, downloads and updates, tools, and more.
- HP Software & Driver Downloads (requires Internet access)—Links to HP specific software downloads and updates.
- HP Support Tools (requires Internet access)—Links to self-help tools and diagnostics offered by HP Instant Support Professional Edition.
- Contact HP for Support—Provides two different options:
 - Chat with an expert online (requires Internet access)—Provides a tool to communicate with a support specialist online through **Active Chat**.
 - Call a support agent—Provides hardware details about the workstation and HP support contact phone number worldwide.

5.2 Troubleshooting Checklist

Before running any of the diagnostic utilities, go through the following checklist to find possible solutions for workstation or software problems.

- Are the workstation and monitor connected to a working electrical outlet?
- Is the workstation turned on?
- Is the green power light illuminated?
- Is the monitor turned on?
- Is the green monitor light illuminated?
- Turn up the monitor brightness and contrast controls if the monitor is dim.
- Press and hold any key. If the system beeps, then the keyboard is operating correctly.
- Check all cables for loose or incorrect connections.
- Reconfigure the workstation after installing a non-PnP expansion board or other option, such as a diskette drive.
- Are all of the necessary device drivers installed?
- Have all printer drivers been installed for each application?
- Remove all diskettes and CDs from the drives before you turn on the system.
- Are you running the latest BIOS version, drivers, and software updates?

5.3 LED Color Definitions

An LED light exists on the front panel of your workstation. The following table describes what each color signifies.

Table 5-1 LED Color Definitions

LED State	LED Color	System Status
Solid	Green	System is on.
Blinking	Green	System is in Standby.
Solid or Blinking	Red	System has error. Refer to section 5.6 .
None	No light	System is in Hibernate or it is off.

5.4 HP Insight Diagnostics Offline Edition

 **NOTE:** HP Insight Diagnostics is included on CD with some computer models only.

The HP Insight Diagnostics utility allows you to view information about the hardware configuration of the computer and perform hardware diagnostic tests on the subsystems of the computer. The utility simplifies the process of effectively identifying, diagnosing, and isolating hardware issues.

The Survey tab is displayed when you invoke HP Insight Diagnostics. This tab shows the current configuration of the computer. From the Survey tab, there is access to several categories of information about the computer. Other tabs provide additional information, including diagnostic test options and test results. The information in each screen of the utility can be saved as an html file and stored on a diskette or USB HP Drive Key.

Use HP Insight Diagnostics to determine if all the devices installed on the computer are recognized by the system and functioning properly. Running tests is optional but recommended after installing or connecting a new device.

You should run tests, save the test results, and print them so that you have printed reports available before placing a call to the Customer Support Center.

 **NOTE:** Third party devices might not be detected by HP Insight Diagnostics.

5.4.1 Key Features and Benefits

HP Insight Diagnostics simplifies the process of effectively identifying, diagnosing, and isolating the hardware issues.

In addition to robust management tools, service tools can be invaluable in quickly resolving system problems. To streamline the service process and resolve problems quickly, it is necessary to have the right information available at the time that a service call is placed. Before calling, write down the configuration of the system. Insight Diagnostics helps provide higher system availability. Typical uses of the Insight Diagnostics are:

- Testing and diagnosing apparent hardware failures
- Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance
- Sending configuration information to another location for more in-depth analysis

5.4.2 Theory of Operation

Insight Diagnostics Offline Edition operates in offline mode only. The operating system is not running and software information from the system is not available to the diagnostics.

Offline Survey—displays the current system configuration.

Insight Diagnostics Test—provides the capability to test functionality of all the major hardware components in the system. The Test feature is designed to be flexible to enable the user to customize test selections by providing different modes and types of testing.

Quick Test—provides a predetermined script where a sample of each hardware component is exercised and requires no user intervention.

Complete Test—provides a predetermined script where each hardware component is fully tested. You can select Interactive or Unattended tests. This will change the devices tested during the Complete Test. There are more tests available in the interactive mode, but these require user intervention.

Custom Test—provides the most flexibility in controlling the testing of a system. The Custom Test mode enables the user to specifically select which devices, tests, and test parameters are run. Users are provided the ability to select tests that do not require any user interaction through the Interactive and Unattended tests modes.

5.4.3 Diagnostic Utility on CD

HP Insight Diagnostics is available on the *Documentation and Diagnostics* CD that was shipped with your HP Workstation.

To start the diagnostic utility on the *Documentation and Diagnostics* CD:

1. Insert the *Documentation and Diagnostics* CD into the workstation.
2. Restart your workstation and press the **F9** key when the F10=Setup message appears on the screen.
3. After POST is completed, a list of bootable devices is displayed. Use the arrow keys to select the **CD-ROM Drive** and press **Enter**. The workstation then boots from the selected non-default device for this one time.
4. When the system boots, HP Insight Diagnostics launches automatically.

5.4.4 Download the ISO Image

To download the latest diagnostic utility:

1. Visit <http://www.hp.com/go/workstationsupport>.
2. Select your HP Workstation.
3. Click the **download driver and software** link.
4. Select your OS.
5. Click the **Diagnostic** link.
6. Locate **HP Insight Diagnostics** and click **Download**.



NOTE: The downloaded file includes instructions on creating the bootable CD.

5.4.5 User Interface

Navigation

The Insight Diagnostics home page contains the following tabs: **Survey**, **Test**, **Status**, and **Log**. These tabs separate the major functions of Insight Diagnostics.

Survey Tab

When the Survey tab is selected, the **Survey** menu displays and enables you to view important system configuration information. The **Summary** view limits the amount of data displayed, while the **Advanced** view shows all the data in the selected category. Regardless of whether you choose **Advanced** or **Summary**, the following categories of information are available on the **Survey** menu:

- **All**—Gives a listing of all categories of information about the computer.
- **Overview**—Gives you a listing of general information about the computer.
- **Architecture**—Provides system BIOS and PCI device information.
- **Asset Control**—Shows asset tag, system serial number, and processor information.
- **Communication**—Shows information about the computer parallel (LPT) and serial (COM) port settings, plus USB and network controller information.
- **Graphics**—Shows information about the graphics controller of the computer.
- **Input Devices**—Shows information about the keyboard, mouse, and other input devices connected to the computer.
- **Memory**—Shows information about all memory in the computer. This includes memory slots on the system board and any memory modules installed.
- **Miscellaneous**—Shows information obtained from the computer configuration memory (CMOS), system management BIOS data, system board data, and diagnostics component information.
- **Storage**—Shows information about storage media connected to the computer. This list includes all fixed disks, diskette drives, and optical drives.
- **System**—Shows information about the system board, processor, chassis, and BIOS, plus internal speaker and PCI bus information.
- **Multimedia**—Shows information about the system Audio devices

Test Tab

The Test tab allows you to choose various parts of the system to test. You can also choose the type of test and testing mode.

There are two test modes to choose from:

- **Interactive Mode**—Provides maximum control over the testing process. The diagnostic software will prompt you for input during tests that require your interaction. You may also determine whether the test passed or failed.
- **Unattended Mode**—Does not display prompts and requires no interaction. If errors are found, they are displayed when testing is complete.

The Insight Diagnostics utility provides the capability to test all the major pieces of hardware in the system. You can select from several types of tests:

- **Quick Test**—Provides a predetermined script where a sample of each hardware component is exercised and requires no user intervention.
- **Complete Test**—Provides a predetermined script where each hardware component is fully tested. You can select **Interactive** or **Unattended** tests. This will change the devices tested during the Complete Test. There are more tests available in the interactive mode, but these require user intervention.

- **Custom Test**—Provides the most flexibility in controlling the testing of a system. The Custom Test mode allows the user to specifically select which devices, tests, and test parameters are run. Users are provided the ability to select tests that do not require any user interaction through the **Interactive** and **Unattended** test modes.

To begin testing:

1. Select the Test tab.
2. On the left side of the tab, select the **Type of Test** to perform (**Quick**, **Complete**, or **Custom**).
3. On the left side of the tab, select the **Test Mode** (**Interactive** or **Unattended**).
4. Select the device to be tested from the drop-down list.
5. Choose how you want the test to be executed, either **Number of Loops** or **Total Test Time**. When choosing to run the test over a specified number of loops, enter the number of loops to perform. If you desire to have the diagnostic test for a specified time period, enter the amount of time in minutes.
6. Click **Begin Testing** to start the test. The Status tab, which allows you to monitor the progress of the test, is automatically displayed during the testing process. When the test is complete, the Status tab shows whether the device passed or failed.
7. If errors are found, go to the Log tab and click the **Error Log** to display more detailed information and recommended actions.

Status Tab

The Status tab displays the status of the selected tests. The type of test executed (for example, **Quick**, **Complete**, **Custom**) is displayed. The main progress bar displays the percent complete of the current set of tests. While testing is in progress a **Cancel Testing** button, which will cancel the test job, is displayed.

After testing has completed, the **Cancel Testing** button is replaced with a **Retest** button. The **Retest** button will retest the last set of tests executed. This enables you to re-run the set of tests without having to go back to the test selection page.

The Status page also shows:

- The devices being tested.
- The tests that are running.
- The overall elapsed time.
- The individual elapsed test times.
- The condition status of each test.

Log Tab

The Log tab contains two logs, a **Test Log** and an **Error Log**, each of which can be selected from the left side of the tab.

The **Test Log** displays all tests that have been executed, the number of times of execution, the number of times the test failed, and the time it took to complete the test. The **Clear Test Log** button will clear the contents of the **Test Log**.


The **Error Log** displays the tests for devices that have failed during the diagnostic testing and includes the following columns of information.

- The Description section describes the error that the diagnostic test found.]
- The Recommended Repair will give a recommended action that should be performed to resolve the failed hardware.
- The Failed Count is the number of times the test has failed.
- The Error Code provides a numerical code for the failure.
- The Clear Error Log button will clear the contents of the Error Log.

Saving and Printing Information in HP Insight Diagnostics

You can save the information displayed in the HP Insight Diagnostics Status and Log tabs to a diskette or a USB 2.0 HP Drive Key (64MB or higher). You cannot save to the hard drive. The system will automatically create an html file that has the same appearance as the information displayed on the screen.

1. Insert a diskette or USB 2.0 HP Drive Key (capacity must be 64MB or higher). USB 1.0 Drive Keys are not supported.
2. Click **Save** in the upper-right corner of the tab.
3. Select **Save to the floppy** or **Save to USB key**.
4. Enter a file name in the File Name box and click the **Save** button. An html file will be saved to the inserted diskette or USB HP Drive Key.
5. Print the information from the storage device used to save it.

 **NOTE:** To exit HP Insight Diagnostics, click **Exit** in the upper-right corner of the screen then remove the Documentation and Diagnostics CD from the optical drive.

5.5 Troubleshooting Using HP Intelligent Manageability Features

The Local Alert Pop-Up Dialog notifies you of an impending or actual hardware failure. If the workstation is connect to a network and the HP Insight Management Agents are installed and configured, a Simple Network Management Protocol (SNMP) trap (message) is sent to the specified SNMP-compliant management application.

5.6 Diagnostic Light Codes

This sections provides an overview of the diagnostic lights that are related to your workstation.


 **NOTE:** The beeps are heard through the on-board piezo speaker and not the chassis speaker. The blinking lights and beeps repeat for five cycles. After that, only the blinking lights repeat.

Table 5-2 Diagnostic Light Codes

Chassis Indicator Lights	
Power LED and Sound Activity	Diagnosis and Service Action
None	<p>System does not power on.</p> <p>Press the power button. If the HDD LED is green:</p> <ol style="list-style-type: none">1. Check that the power supply cables are properly connected to the system board.2. Remove the expansion cards one at a time.3. Replace the system board. <p>Or</p> <p>Press the power button. If the HDD LED does not illuminate:</p> <ol style="list-style-type: none">1. Check that the unit is plugged into a working AC outlet.2. Check that the power button harness is properly connected to the in-line front panel I/O device assembly connector.3. Check that the power supply cables are properly connected to the system board.4. Check the power supply functionality.<ol style="list-style-type: none">a. Disconnect the AC power.b. Remove all internal power supply cables from the system board.c. Plug in the AC power.<ul style="list-style-type: none">• If the power supply fan spins and the BIST LED lights, the power supply is functional. Replace the system board.• If the power supply fan does not spin or the BIST LED does not light, replace the power supply.
Beeps and blinks RED two times	<p>Thermal shutdown:</p> <ol style="list-style-type: none">1. Ensure the workstation air vents are not blocked and the cooling fans are running.2. Press the power button, and see if the fans on the CPU heatsinks spin. If they are not spinning, ensure the fan cable is plugged into the system board. Ensure the CPU heatsinks are properly seated.3. If the CPU heatsinks are plugged in and seated but are not spinning, replace the CPU heatsinks.4. Reseat the CPU heatsinks and verify the fan assemblies are properly attached.
Beeps and blinks RED 3 times	<p>CPU is not installed:</p> <ol style="list-style-type: none">1. Install CPU.2. Reseat CPU.
Beeps and blinks RED 4 times	<p>Power supply failure:</p> <ol style="list-style-type: none">1. Locate the faulty device by removing all devices and then reinstalling one at a time until workstation fails. Replace the device causing the failure. Continue adding devices to ensure all are functioning properly.2. Check the power supply functionality.<ol style="list-style-type: none">a. Disconnect AC power.d. Remove all internal power supply cables from the system board.e. Plug in AC power.<ul style="list-style-type: none">• If the power supply fan spins and the BIST LED lights, then the power supply is functional. Replace the system board.• If the power supply fan does not spin or the BIST LED does not light, replace the power supply.

Table 5-2 Diagnostic Light Codes (continued)

Chassis Indicator Lights (continued)	
Power LED and Sound Activity	Diagnosis and Service Action
Beeps and blinks RED 5 times	Pre-video memory error: <ol style="list-style-type: none">1. Reseat memory modules.2. Replace memory modules one at a time to find the faulty module.3. Replace third-party modules with HP memory.4. Replace system board.
Beeps and blinks RED 6 times	Pre-video graphics card error: For systems with integrated graphics, replace the system board. For systems with graphic cards: <ol style="list-style-type: none">1. Reseat the graphics card.2. Replace the graphics card.3. Replace the system board.
Beeps and blinks RED 7 times	System board failure (ROM detected failure before video). Replace system board.
Beeps and blinks RED 8 times	Invalid ROM based on bad checksum. <ol style="list-style-type: none">1. Reflash the ROM.2. Replace the system board.
Beeps and blinks RED 9 times	System powers on but is unable to boot. <ol style="list-style-type: none">1. Replace the system board.2. Replace the processor.

5.7 Troubleshooting Scenarios and Solutions

This section presents an extensive overview of various troubleshooting scenarios and includes possible solutions for each.

5.7.1 Solving Minor Problems

Table 5-3 Solving Minor Problems

Problem	Cause	Possible Solution
Workstation appears locked up and does not turn off when the power button is pressed.	Software control of the power switch is not functional.	<ol style="list-style-type: none"> 1. Press and hold the power button for at least four seconds until the workstation turns off. 2. Disconnect the electrical plug from outlet.
Workstation will not respond to USB keyboard or mouse.	Workstation is in Standby mode.	Press the power button to resume from Standby mode.
CAUTION: When attempting to resume from Standby mode, do not hold down the power button for more than four seconds. Otherwise, the workstation will shut down and you will lose your data.		
Workstation seems to be locked up.	Program in use has stopped responding to commands.	<ol style="list-style-type: none"> 1. Attempt the normal shutdown procedure. 2. Press the power button for four or more seconds to turn off the power. 3. Restart the workstation using the power button.
Workstation does not retain date and time when powered off.	Real-time clock (RTC) battery might need to be replaced.	<ol style="list-style-type: none"> 1. For Windows, open the control panel and reset the date and time. 2. Replace the RTC battery.
Workstation appears to pause periodically.	Network driver is loaded and no network connection is established.	Establish a network connection, or use Computer Setup or Microsoft Windows Device Manager to disable the network controller.
Cursor does not move using the arrow keys on the keypad.	The Num Lock key might be on.	Press the Num Lock key. The Num Lock key can be disabled (or enabled) in Computer Setup.
Poor performance is experienced.	Processor is hot.	<ol style="list-style-type: none"> 1. Be sure airflow to the workstation is not blocked. 2. Be sure the fans are connected and working properly (some fans only operate when needed). 3. Be sure the CPU heatsink is installed properly.
	There is not enough memory.	Add more memory.
	Hard drive is full.	Transfer data from the hard drive to create more space on the hard drive.
Workstation powered off automatically and beeps and blink RED twice.	Processor thermal protection activated:	<ol style="list-style-type: none"> 1. Be sure workstation air vents are not blocked and the cooling fan is running. 2. Open hood, press power button, and see if the processor fan spins. If not spinning, be sure the fan's cable is plugged onto the system board header. Be sure the fan is fully/properly seated or installed. 3. Replace the processor fan. 4. Reseat CPU heatsink and verify that the fan assembly is properly attached.
	A fan might be blocked or not turning. OR The CPU heatsink is not properly attached to the processor.	

Table 5-3 Solving Minor Problems

Problem	Cause	Possible Solution
System does not power on and the LEDs on the front of the workstation are not flashing.	System is unable to power on.	<p>Press and hold the power button for less than four seconds. If the hard drive LED turns green:</p> <ol style="list-style-type: none">1. Check that the power supply cables are properly connected to the system board.2. Remove the expansion cards.3. Replace the system board. <p>OR</p> <p>Press and hold the power button for less than four seconds. If the hard drive LED does not illuminate:</p> <ol style="list-style-type: none">1. Check that the unit is plugged into a working AC outlet.2. Open the access panel and check that the power button harness is properly connected to the in-line front panel I/O device assembly connector.3. Check that the power supply cables are properly connected to the system board.4. Check the power supply functionality.<ol style="list-style-type: none">a. Disconnect the AC power.f. Remove all internal power supply cables from the system board.g. Plug in the AC power.<ul style="list-style-type: none">• If the power supply fan spins and the BIST LED lights, the power supply is functional, so replace the system board.• If the power supply fan does not spin or the BIST LED does not light, replace the power supply.

5.7.2 Solving Power Supply Problems

Testing Power Supply

Before replacing the power supply, use the Built-In Self-Test (BIST) feature to learn if the power supply still works.

To test the power supply:

1. Disconnect all internal power supply cables.
2. Plug in the AC power.
 - If the green BIST LED on the rear of the workstation is lit AND the fan is spinning, the power supply is functional.
 - If the green BIST LED is not lit OR the fan is not spinning, replace the power supply.



Table 5-4 Power Supply Problems

Problem	Cause	Solution
Power supply shuts down intermittently.	Power supply fault.	Replace the power supply.
Workstation powered off automatically and beeps and blinks RED two times	Processor thermal protection activated: A fan might be blocked or not turning. OR The CPU heatsink assembly is not properly attached to the processor.	<ol style="list-style-type: none">1. Be sure that the workstation air vents are not blocked and the cooling fan is running.2. Open the access panel, press the power button, and see if the fan on the heatsink spins. If the fan is not spinning, be sure the heatsink cable is plugged into the system board header. Be sure the fan is properly seated or installed.3. Replace the CPU heatsink.4. Reseat the CPU heatsink and verify that the fan assembly is properly attached.

5.7.3 Solving Diskette Problems

Table 5-5 Diskette Problems

Problem	Cause	Solution
Diskette drive light stays on.	Diskette is damaged.	In Windows, open Explorer and select File > Properties > Tools . Under Error-checking, click Check Now .
	Diskette is incorrectly inserted.	Remove diskette and reinsert.
	Files on diskette are damaged.	Reload files on new diskette.
	Drive cable is not properly connected.	Reconnect power cable. Be sure that all four pins are connected.
Drive not found.	Cable is loose.	Reseat diskette drive data and power cables.
	Removable drive is not seated properly.	Reseat the drive.
Diskette drive cannot write to a diskette.	Diskette is not formatted.	Format the diskette.
	Diskette is write-protected.	Use another diskette or remove the write protection.
	Writing to the wrong drive.	Check the drive letter in the path statement.
	Not enough space is left on the diskette.	Use another diskette.
	Diskette write control is enabled.	Use Computer Setup to check the storage security feature disabled settings.
	Diskette is damaged.	Replace the damaged disk.

Table 5-5 Diskette Problems (continued)

Problem	Cause	Solution
Cannot format diskette.	Invalid media reported.	When formatting a disk in MS-DOS, you might need to specify diskette capacity. For example, to format a 1.44-MB diskette, enter the following command at the MS-DOS prompt: FORMAT A: /F:1440
A problem has occurred with a disk transaction.	The directory structure is bad, or there is a problem with a file.	In Windows, right-click Start > Explore , and select a drive. Select File > Properties > Tools . Under Error-checking, click Check Now .
Diskette drive cannot read a diskette.	Diskette is not formatted.	Format the diskette.
	You are using the wrong diskette type for the drive type.	Check the type of drive that you are using and use the correct diskette type.
	You are reading the wrong drive.	Check the drive letter in the path statement.
	Diskette is damaged.	Replace the diskette with a new one.
"Invalid system disk" message is displayed.	A diskette that does not contain the system files needed to start the workstation has been inserted in the drive.	When drive activity stops, remove the diskette and press the Spacebar . The workstation should start up.
	Diskette error has occurred.	Restart the workstation by pressing the power button.
Cannot Boot from Diskette.	Diskette is not bootable.	Replace with a bootable diskette.
	Diskette boot has been disabled in Computer Setup.	Run Computer Setup and enable diskette boot in Storage > Boot Order .
	Removable media boot has been disabled in Computer Setup.	Run Computer Setup and enable Removable Media Boot in Storage > Storage Options .

5.7.4 Solving Hard Drive Problems

Table 5-6 Hard Drive Problems

Problem	Cause	Solution
Hard drive error occurs.	Hard disk has bad sectors or has failed.	Use a utility to locate and block usage of bad sectors. If necessary, reformat the hard disk.
Disk transaction problem.	Either the directory structure is bad or there is a problem with a file.	In Windows, open Explorer, select a drive, and select File > Properties > Tools . Under Error-checking, click Check Now .
Drive not found (identified).	Loose cable.	Check cable connections.
	The system might not have automatically recognized a newly installed device.	<ol style="list-style-type: none"> 1. Run Computer Setup. 2. If the system still does not recognize the new device, check to see if the device is listed within Computer Setup. If it is listed, the probable cause is a driver problem. If it is not listed, the probable cause is a hardware problem. 3. If this is a newly installed drive, enter Setup and try adding a POST delay under Advanced > Power-On.
	Drive's SATA controller is disabled in Computer Setup.	Run Computer Setup and enable the SATA controllers in Storage>Storage Options .
	Drive's SCSI controller is disabled in Computer Setup.	Run Computer Setup and enable the SCSI controllers in Storage>Storage Options .
	Drive responds slowly immediately after power-up.	Run Computer Setup and increase the POST Delay in Advanced > Power-On Options .
Nonsystem disk/NTLDR missing message.	System is trying to start from a non-bootable diskette.	Remove the diskette from the diskette drive.
	System files missing or not properly installed.	<ol style="list-style-type: none"> 1. Insert a bootable system diskette and restart. 2. Verify hard drive is partitioned and formatted. 3. Install system files for the appropriate operating system, if necessary.
	Hard drive boot disabled in Computer Setup.	Run Computer Setup and enable the hard drive entry in the Storage Options list.
Workstation does not start.	Hard drive is damaged.	Observe the beeps and LED lights on the front of the workstation. Refer to section 5.8 "Power On Self Test (POST) and Error Messages" .

5.7.5 Solving Display Problems

Table 5-7 Display Problems

Problem	Cause	Solution
Blank screen (no video).	The cable connections are not correct.	Check the cable connections from the monitor to the workstation and to a working electrical outlet.
	The monitor is off.	Switch the monitor to on (LED is on). You might need to refer to the monitor manual for an explanation of the LED signals.
	Screen blanking utility installed or energy saver features enabled.	Press any key or click the mouse button and, if set, enter your password.
	System ROM is bad; system is running in FailSafe Boot Block mode (indicated by eight beeps).	Reflash the ROM using a ROMPaq diskette.
	Computer is in Standby mode.	Press the power button to resume from Standby mode.
CAUTION: When attempting to resume from Standby mode, do not hold down the power button for more than four seconds. Otherwise, the workstation will shut down and you will lose your data.		
	Monitor settings in the workstation are not compatible with the monitor.	<ol style="list-style-type: none"> 1. Restart the workstation and press F8 during startup when you see "Press F8" in the bottom-right corner of the screen. 2. Using the keyboard arrow keys, select Enable VGA Mode and press Enter. 3. In Windows Control Panel, double-click the Display icon and select the Settings tab. 4. Use the sliding control to reset the resolution.
The display works properly during the POST but goes blank when the OS starts.	The display settings in the OS are incompatible with your graphics card and monitor.	<ol style="list-style-type: none"> 1. Restart your workstation in VGA mode. 2. After the OS starts, change the display settings to match those supported by your graphics card and monitor. 3. Refer to your OS and graphics card documentation for information on changing display settings.
Monitor does not function properly when used with energy saver features.	Monitor without energy saver capabilities is being used with energy saver features enabled.	Disable monitor energy saver feature.
Dim characters.	The brightness and contrast controls are not set properly.	Adjust the monitor brightness and contrast controls.
	Cables are not properly connected.	Check that the graphics cable is securely connected to the graphics card and the monitor.
Blurry video or requested resolution cannot be set.	If the graphics controller was upgraded, the correct video drivers might not be loaded.	Install the video drivers included in the upgrade kit.
	Monitor is not capable of displaying requested resolution.	Change requested resolution.
The picture is broken up, rolls, jitters, or flashes.	The monitor connections might be incomplete or the monitor might be incorrectly adjusted.	<ol style="list-style-type: none"> 1. Be sure the monitor cable is securely connected to the workstation. 2. In a two-monitor system or if another monitor is in close proximity, be sure the monitors are not interfering with each other's electromagnetic field by moving them apart. 3. Fluorescent lights or fans might be too close to the monitor.
	Monitor must be degaussed.	Degauss the monitor.
Vibrating or rattling noise coming from inside a CRT monitor when powered on.	Monitor degaussing coil has been activated.	None. It is normal for the degaussing coil to be activated when the monitor is powered on.
Clicking noise coming from inside a CRT monitor.	Electronic relays have been activated inside the monitor.	None. It is normal for some monitors to make a clicking noise when turned on and off, when going in and out of Standby mode, and when changing resolutions.

Table 5-7 Display Problems (continued)

Problem	Cause	Solution
High-pitched noise coming from inside a flat panel monitor.	Brightness and contrast settings are too high.	Lower brightness and contrast settings.
Fuzzy focus; streaking, ghosting, or shadowing effects; horizontal scrolling lines; faint vertical bars; or unable to center the picture on the screen. (Flat panel monitors using an analog VGA input connection only.)	Flat panel monitor's internal digital conversion circuits might be unable to correctly interpret the output synchronization of the graphics card.	<ol style="list-style-type: none">1. Select the monitor's Auto-Adjustment option in the monitor's on-screen display menu.2. Go to the HP Support Web site and check for an updated display driver.
Certain typed symbols do not appear correct.	The font you are using does not support that particular symbol.	Use the Character Map to locate the and select the appropriate symbol. Click Start > All Programs > Accessories > System Tools > Character Map . You can copy the symbol from the Character Map into a document.

5.7.6 Solving Audio Problems

Table 5-8 Audio Problems

Problem	Cause	Solution
Sound does not come out of the speaker or headphones.	Software volume control is turned down.	Double-click the Speaker icon on the taskbar and use the volume slider to adjust the volume.
	The external speakers are not turned on.	Turn on the external speakers.
	External speakers plugged into the wrong audio jack.	See the sound card documentation for proper speaker connection.
	Audio cable is not connected.	Connect the audio cable between the CD or DVD-ROM drive and the system board.
	Digital CD audio is not enabled.	Enable digital CD audio: <ol style="list-style-type: none"> 1. Open the Control Panel and select System. 2. On the Hardware tab, click the Device Manager button. 3. Right-click the CD/DVD device and select Properties. 4. On the Properties tab, be sure "Enable digital CD audio for this CD-ROM device" is selected.
	Headphones or devices connected to the line-out connector mute the internal speaker.	Turn on and use headphones or external speakers, if connected, or disconnect headphones or external speakers.
	Volume is muted.	<ol style="list-style-type: none"> 1. Open the Control Panel, click Sound, Speech and Audio Devices, then click Sounds and Audio Devices. 2. Deselect the Mute checkbox.
	Computer is in Standby mode.	Press the power button to resume from Standby mode.
CAUTION: When attempting to resume from Standby mode, do not hold down the power button for more than four seconds. Otherwise, the workstation will shut down and you will lose your data.		
Noise or no sound comes out of the speakers or headphones.		<ol style="list-style-type: none"> 1. If using digital speakers that have a stereo jack and want the system to auto-switch to digital, use a stereo-to-mono adapter to properly engage the auto-sense feature or use the multimedia device properties to manually switch the audio signal from analog to digital. 2. If the headphones have a mono jack, use the multimedia device properties to switch the system to analog out.
NOTE: If you set digital as the Output Mode, the internal speaker and external analog speakers will no longer output audio until you switch back to an auto-sense or analog mode. If you set analog as the Output Mode, external digital speakers will not function until you change the output mode back to an auto-sense or digital mode.		
Sound cuts in and out.	Processor resources are being used by other open applications.	Shut down all open processor-intensive applications.
Workstation appears to be locked up while recording audio.	The hard disk might be full.	<ol style="list-style-type: none"> 1. Before recording, be sure there is enough free space on the hard disk. 2. Try recording the audio file in a compressed format.

5.7.7 Solving Printer Problems

Table 5-9 Printer Problems

Problem	Cause	Solution
Printer does not print.	Printer is not turned on and online.	Turn the printer on and be sure it is online.
	Printer is out of paper.	Add paper to printer.
	The correct printer driver for the application are not installed.	<ol style="list-style-type: none">1. Install the correct printer driver for the application.2. Try printing using the MS-DOS command: <pre>DIR C:\ > [printer port]</pre>where [printer port] is the address of the printer being used. If the printer works, reload the printer driver.
	If you are on a network, you might not have made the connection to the printer.	Make the proper network connections to the printer.
	Printer might have failed.	Run printer self-test.
Printer does not turn on.	The cables might not be connected properly.	Reconnect all cables.
Printer prints garbled information.	The correct printer driver is not installed.	Install the correct printer driver for the application.
	The cables might not be connected properly.	Reconnect all cables.
	Printer memory might be overloaded.	Reset the printer by turning it off for one minute, then turn it back on.

5.7.8 Solving Keyboard and Mouse Problems

Table 5-10 Keyboard and Mouse Problems

Problem	Cause	Solution
Keyboard commands and typing are not recognized by the workstation.	Keyboard connector is not properly connected.	<ol style="list-style-type: none">1. Shut down the workstation.2. Reconnect the keyboard to the back of the workstation and restart the workstation.
	Program in use has stopped responding to commands.	Shut down the workstation using the mouse and then restart the workstation.
	Keyboard needs repairs.	Replace the keyboard.
	Keyboard key is stuck down.	Remove any debris from the keyboard.
	Workstation is in Standby mode. Press the power button to resume from Standby mode.	
WARNING: When attempting to resume from Standby mode, do not hold down the power button for more than four seconds. Otherwise, the workstation will shut down and you will lose your data.		
Cursor will not move using the arrow keys on the keypad.	The Num Lock key might be on.	Press the Num Lock key. The Num Lock light should not be on if you want to use the arrow keys. The Num Lock key can be disabled (or enabled) in Computer Setup.
Mouse does not respond to movement or is too slow.	Mouse connector is not properly plugged into the back of the workstation.	<ol style="list-style-type: none">1. Shut down the workstation using the keyboard.2. Plug the mouse connector into the PS/2 mouse connector slot in the workstation and restart the workstation.
	You need to increase mouse acceleration.	<ol style="list-style-type: none">1. In Windows, click Start > Control Panel and double-click Mouse.2. Select the Motion tab and adjust the speed.
	Program in use has stopped responding to commands.	Shut down the workstation using the keyboard and then restart the workstation.
	Mouse needs repairs.	Replace the mouse.
	Workstation is in Standby mode. Press the power button to resume from Standby mode.	
CAUTION: When attempting to resume from Standby mode, do not hold down the power button for more than four seconds. Otherwise, the workstation will shut down and you will lose your data.		
Mouse will only move vertically or horizontally, or movement is jerky.	Mouse roller ball is dirty.	Remove roller ball cover from the bottom of the mouse and clean it.

5.7.9 Solving Front Panel Component Problems

If you are experiencing problems with one of the front panel ports, you might be able to try your device in the corresponding port on the back side of the computer. If this does not fix the problem, or you must use the front panel ports, continue troubleshooting.

Some problems in this section are also discussed in other troubleshooting suggestions in this chapter.

Table 5-11 Front Panel Component Problems

Problem	Cause	Solution
A USB device, headphone, or microphone is not recognized by the workstation.	It is not properly connected.	Reconnect the device to the front of the workstation and restart the workstation.
	The device does not have power.	If the USB device requires AC power, be sure one end is connected to the device and one end is connected to a live outlet.
	The correct device driver is not installed.	<ol style="list-style-type: none">1. Install the correct driver for the device.2. You might need to reboot the workstation.
	The cable from the device to the computer does not work.	If possible, replace the cable.
	The device is not working.	Replace the device.
A USB, audio, and IEEE-1394 devices are not working.	The internal cables might not be connected to the system board or the PCI card.	<ol style="list-style-type: none">1. Turn off the workstation.2. Connect the cables correctly.
A device in the IEEE-1394 port is not responsive.	Cables of new external device are loose or power cables are unplugged.	Be sure that all cables are properly and securely connected.
	The power switch on the device is not turned on.	Turn off the workstation, turn on the external device, then turn on the workstation to integrate the device with the workstation system.

5.7.10 Solving Hardware Installation Problems

You might need to reconfigure the workstation when you add or remove hardware, such as an additional diskette drive. If you install a PnP device, Windows XP automatically recognizes the device and configures the workstation. If you install a non-PnP device, you must reconfigure the workstation after completing installation of the new hardware. In Windows XP, use the Add Hardware Wizard and follow the on-screen instructions.

Table 5-12 Hardware Installation Problems

Problem	Cause	Solution
A new device is not recognized as part of the system.	Device is not seated or connected properly.	Be sure that the device is properly and securely connected and that pins in the connector are not bent down.
	Cables of new external device are loose or power cables are unplugged.	Be sure that all cables are properly and securely connected and that pins in the cable or connector are not bent down.
	Power switch of new external device is not turned on.	Restart the workstation, turn on the external device, then turn on the workstation to integrate the device with the workstation system.
	When the system advised you of changes to the configuration, you did not accept them.	Reboot the workstation and follow the instructions for accepting the changes.
	A PnP board might not automatically configure when added if the default configuration conflicts with other devices.	Use Windows XP Device Manager to deselect the automatic settings for the board and choose a basic configuration that does not cause a resource conflict. You can also use Computer Setup to reconfigure or disable devices to resolve the resource conflict.
	Device hardware is not properly jumpered or otherwise configured.	Read the device-specific configuration information and check for incorrect settings or conflicts with other devices already installed in the system.
Workstation will not start.	Wrong memory modules were used in the upgrade or memory modules were installed in the wrong location.	<ol style="list-style-type: none">1. Review the documentation that came with the system to determine if you are using the correct memory modules and to verify the proper installation.2. Observe the beeps and LED lights on the front of the workstation. Refer to section 5.8 “Power On Self Test (POST) and Error Messages” to determine possible causes.

5.7.1.1 Solving Network Problems

These guidelines do not discuss the process of debugging the network cabling.

Table 5-13 Network Problems

Problem	Cause	Solution
Wake-on-LAN feature is not functioning.	Wake-on-LAN is not enabled.	Use the Network control application to enable Wake-on-LAN.
Network driver does not detect network controller.	Network controller is disabled.	Run Computer Setup and enable network controller.
	Incorrect network driver.	Check the network controller documentation for the correct driver or obtain the latest driver from the manufacturer's Web site.
Network status link light does not turn on or it never flashes. The network status light should flash when there is network activity.	No active network is detected.	Check cabling and network equipment for proper connection.
	Network controller is not set up properly.	Use the Network control application to verify that the device is working properly.
	Network driver is not properly loaded.	Reinstall network drivers.
	System cannot autosense the network.	Disable auto-sensing capabilities and force the system into the correct operating mode.
Diagnostics reports a failure.	The cable is not securely connected.	Be sure that both ends of the data cable are securely connected.
	The cable is attached to the incorrect connector.	Be sure that the cable is attached to the correct connector.
	There is a problem with the cable or a device at the other end of the cable.	Be sure that the cable and device at the other end are operating correctly.
	Network controller interrupt is shared with an expansion board.	Under the Computer Setup Advanced menu, change the resource settings for the board.
	The network controller is defective.	Replace the NIC.
Diagnostics passes, but the workstation does not communicate with the network.	Network drivers are not loaded, or driver parameters do not match current configuration.	<ol style="list-style-type: none"> 1. Be sure the network drivers are loaded and that the driver parameters match the configuration of the network controller. 2. Be sure the correct network client and protocol is installed.
	The network controller is not configured for this workstation.	Select the Network icon in the Control Panel and configure the network controller.
Network controller stopped working when an expansion board was added to the workstation.	Network controller interrupt is shared with an expansion board.	Under the Computer Setup Advanced menu, change the resource settings for the board.
	The network controller requires drivers.	Verify that the drivers were not accidentally deleted when the drivers for a new expansion board were installed.
	The expansion board installed is a network card (NIC) and conflicts with the embedded NIC.	Under the Computer Setup Advanced menu, change the resource settings for the board.
Network controller stops working without apparent cause.	The files containing the network drivers are corrupted.	Reinstall the network drivers, using the <i>Restore Plus!</i> CD.
	The cable is not securely connected.	Be sure that both ends of the cable are securely attached to the correct devices.
	The network controller is defective.	Replace the NIC.
New network card will not boot.	New network card might be defective or might not meet industry-standard specifications.	Install a working, industry-standard NIC, or change the boot sequence to boot from another source.
Cannot connect to network server when attempting Remote System Installation.	The network controller is not configured properly.	Verify Network Connectivity, that a DHCP Server is present, and that the Remote System Installation Server contains the NIC drivers for your NIC.

Table 5-13 Network Problems (continued)

Problem	Cause	Solution
System setup utility reports unprogrammed EEPROM.	Unprogrammed EEPROM.	Flash the ROM. See section 3.2.4 “ROM Flash” .

5.7.12 Solving Memory Problems

△ **CAUTION:** For those systems that support ECC memory, HP does not support mixing ECC and non-ECC memory. Otherwise, the system will not boot the operating system.

Table 5-14 Memory Problems

Problem	Cause	Solution
System will not boot or does not function properly after installing additional memory modules.	Memory module is not the correct type or speed or the new memory module is not seated properly.	Replace module with the correct industry-standard device for the workstation. On some models, ECC and non-ECC memory modules cannot be mixed.
Out of memory error.	Memory configuration might not be set up correctly.	Use the Device Manager to check memory configuration.
	You have run out of memory to run the application.	Check the application documentation to determine the memory requirements.
Memory count during POST is wrong.	The memory modules might not be installed correctly.	Check that the memory modules have been installed correctly and that proper modules are used.
Insufficient memory error during operation.	Too many Terminate and Stay Resident programs (TSRs) are installed.	Delete any TSRs that you do not need.
	You have run out of memory for the application.	Check the memory requirements for the application or add more memory to the workstation.
Beeeps and power LED flashes RED five times.	Memory is installed incorrectly or is bad.	<ol style="list-style-type: none"> 1. Reseat DIMMs. 2. Replace DIMMs one at a time to isolate the faulty module. 3. Replace third-party memory with HP memory. 4. Replace the system board.
More than 2GB of RAM is installed, yet the 32-bit OS only sees 2GB.	Memory remapping is enabled.	Enter Computer Setup (F10) and disable memory remapping: Advanced > Chipset/Memory .
A total of 4GB of RAM is installed, yet the 32-bit OS only sees about 3GB.	A 32-bit OS is limited by 4GB of address space, and some of space is used by I/O devices.	Your options are limited. You might try using a video card that uses less on-board memory.
A 64-bit OS does not see all installed memory.	Memory remapping is disabled.	Enter Computer Setup (F10) and enable memory remapping: Advanced > Bus Options > Memory Remapping .

5.7.13 Solving Processor Problems

Table 5-15 Processor Problems

Problem	Cause	Solution
Poor performance is experienced.	Processor is hot.	<ol style="list-style-type: none">1. Be sure the airflow to the workstation is not blocked.2. Be sure the fans are connected and working properly (some fans only operate when needed).3. Be sure the CPU heatsink is installed properly.
Power LED is RED and stays on.	Processor is not seated properly or not installed.	<ol style="list-style-type: none">1. Check to see that the processor is present.2. Reseat the processor.

5.7.14 Solving CD-ROM and DVD Problems

Table 5-16 CD-ROM and DVD Problems

Problem	Cause	Solution
System will not boot from CD-ROM or DVD drive.	The CD-ROM or DVD boot is not enabled through the Computer Setup utility.	Run the Computer Setup utility and enable booting to removable media and verify boot order settings.
	Non-bootable CD in drive.	Try a bootable CD in the drive.
CD-ROM or DVD devices are not detected or driver is not loaded.	Drive is not connected properly or not properly configured.	1. Reconnect power and data cables to the drive.
		2. Install correct device driver.
Movie will not play in the DVD drive.	Movie might be regionalized for a different country.	See the documentation that came with the DVD drive.
	Decoder software is not installed.	Install decoder software.
Cannot eject compact disc (tray-load unit).	Disc not properly seated in the drive.	1. Shut down the workstation and insert a thin metal rod into the emergency eject hole and push firmly.
		2. Slowly pull the tray out from the drive until the tray is fully extended, then remove the disc.
CD-ROM, CD-RW, DVD-ROM, or DVD-R/RW drive cannot read a disc or takes too long to start.	CD has been inserted upside down.	Re-insert the CD with the label facing up.
	The DVD-ROM drive takes longer to start because it has to determine the type of media played, such as audio or video.	Wait at least 30 seconds to let the DVD-ROM drive determine the type of media being played. If the disc still does not start, read the other solutions listed for this topic.
	CD or DVD disc is dirty.	Clean CD or DVD with a CD cleaning kit.
	Windows does not detect the CD-ROM or DVD-ROM drive.	1. Use Device Manager to remove or uninstall the device in question. 2. Restart the workstation and let Windows detect the device.
Recording audio CDs is difficult or impossible.	Wrong or poor quality media type.	1. Try using a slower recording speed. 2. Verify that you are using the correct media for the drive. 3. Try a different brand of media. Quality varies widely between manufacturers.

5.7.15 Solving Internet Access Problems

Table 5-17 Internet Access Problems

Problem	Cause	Solution
Unable to connect to the Internet.	Internet Service Provider (ISP) account is not set up properly.	Verify Internet settings or contact the ISP for assistance.
	Modem is not set up properly.	Reconnect the modem. Verify the connections are correct using the quick setup documentation.
	Web browser is not set up properly.	Verify that the Web browser is installed and set up to work with your ISP.
	Cable/DSL modem is not plugged in.	Plug in cable/DSL modem. You should see a “power” LED light on the front of the cable/DSL modem.
	Cable/DSL service is not available or has been interrupted due to bad weather.	Try connecting to the Internet at a later time or contact your ISP. (If the cable/DSL service is connected, the “cable” LED light on the front of the cable/DSL modem will be on.)
	The network cable is disconnected.	Connect the network cable between the cable modem and the workstation’s RJ-45 connector. (If the connection works, the “PC” LED light on the front of the cable/DSL modem will be on.)
	IP address is not configured properly.	Contact the ISP for the correct IP address.
	Cookies are corrupted.	In Windows, open the Control Panel and double-click Internet Options . On the General tab, click the Delete Cookies button.
Cannot automatically launch Internet programs.	You must log on to the ISP before some programs will start.	Log on to the ISP and launch the desired program.
Internet takes too long to download Web sites.	Modem is not set up properly.	<p>Verify that the correct modem speed and COM port are selected.</p> <p>For Windows:</p> <ol style="list-style-type: none"> 1. Open the Control Panel. 2. Double-click System. 3. Select the Hardware tab. 4. In the Device Manager area, click the Device Manager button. 5. Double-click Ports (COM & LPT). 6. Right-click the COM port your modem uses, then click Properties. 7. Under Device status, verify that the modem is working properly. 8. Under Device usage, verify the modem is enabled. 9. If there are further problems, click the Troubleshoot button and follow the on-screen instructions.

5.8 Power On Self Test (POST) and Error Messages

POST is a series of diagnostic tests that runs automatically when the system is turned on. An audible, visual, or both message occurs if the POST encounters a problem. POST checks the following items to ensure that the workstation system is functioning properly:

- Keyboard
- Memory modules
- Diskette drives
- All SATA and SCSI mass storage devices
- Processors
- Controllers


 **NOTE:** If the Power-On Password is set, a key icon appears on the screen while POST is running. You must enter the password before continuing.

Table 5-18 POST Error Messages

Screen Message	Probable Cause	Recommended Action
101—Option ROM Error	System ROM checksum.	Verify the correct ROM. <ol style="list-style-type: none">1. Flash the ROM, if needed.2. If an expansion card was recently added, remove it and see if the problem remains.3. Clear CMOS.4. If the message disappears, there might be a problem with the expansion card.5. Replace the system board.
102—System Board Failure	DMA, timers, etc.	<ol style="list-style-type: none">1. Clear CMOS.2. Remove expansion boards.3. Replace the system board.
110—Out of Memory for Option ROMs	Option ROM for a device was unable to run due to memory constraints.	Run Computer Setup and disable unneeded devices from Advanced > Onboard Devices . Or, disable option ROMs from Advanced > Device Options .
162—System Options Not Set	Configuration incorrect. RTC battery might need to be replaced.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup).2. Set the date and time under Control Panel or in F10 Setup depending on the operating system.3. If the problem persists, replace the RTC battery.
163—Time and Date Not Set	Invalid time or date in configuration memory. RTC (real-time clock) battery might need to be replaced. CMOS jumper might not be properly installed.	<ol style="list-style-type: none">1. Set the date and time under Control Panel or in F10 Setup depending on the operating system.2. If the problem persists, replace the RTC battery.
164—Memory Size Error	Memory configuration is incorrect.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup) or Windows utilities.2. Be sure memory modules are installed properly.3. If third-party memory has been added, test using HP only memory.4. Verify proper memory module type.
201—Memory Error	RAM failure.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup) or Windows utilities.2. Be sure that memory modules are installed correctly.3. Verify proper memory module type.4. Remove and replace memory module(s) one at a time to isolate faulty module.5. Replace the faulty memory module(s).6. If error persists after replacing memory modules, replace the system board.
202—Memory Type Mismatch	Memory modules do not match each other.	Replace memory modules with matched sets.

Table 5-18 POST Error Messages (continued)

Screen Message	Probable Cause	Recommended Action
207—ECC Corrected Single Bit Errors in Memory Socket(s) y,y	Single Bit ECC error.	<ol style="list-style-type: none"> 1. Verify proper memory module type. 2. Try another memory socket. 3. Replace memory module if problem persists.
212—Failed Processor	Processor has failed to initialize.	<ol style="list-style-type: none"> 1. Reseat the processor in its socket. 2. If the processor does not respond, replace it.
213—Incompatible memory Module in memory Socket(s) X,X, X	A memory module in memory socket identified in the error message is missing critical SPD information, or is incompatible with the chipset.	<ol style="list-style-type: none"> 1. Verify proper memory module type. 2. Try another memory socket. 3. Replace memory with a module conforming to the SPD standard.
214—DIMM Configuration Warning	DIMMs not installed correctly (not paired correctly).	Refer to section 4.19 “Memory” for the correct memory configurations and reseat the DIMMs accordingly.
215—Memory Mismatch Warning	There are one or more mismatched pairs of DIMMs between channel A and channel B. Some memory has been disabled. Install matching pairs.	Refer to section 4.19 “Memory” for the correct memory configurations and reseat the DIMMs accordingly.
301—Keyboard Error	Keyboard failure.	<ol style="list-style-type: none"> 1. Reconnect keyboard with workstation turned off. 2. Check connector for bent or missing pins. 3. Be sure that none of the keys are pressed. 4. Replace keyboard.
303—Keyboard Controller Error	I/O board keyboard controller.	<ol style="list-style-type: none"> 1. Reconnect keyboard with workstation turned off. 2. Replace the system board.
304—Keyboard or System Unit Error	Keyboard failure.	<ol style="list-style-type: none"> 1. Reconnect the keyboard with workstation turned off. 2. Be sure that none of the keys are pressed. 3. Replace keyboard. 4. Replace system board.
402—Parallel Port 2 Address Assignment Conflict	IRQ address conflicts with another device.	Reset the IRQ.
501—Display Adapter Failure	Graphics display controller.	<ol style="list-style-type: none"> 1. Reseat the graphics card (if applicable). 2. If using PCI Express card with auxiliary power cable, be sure it is attached. 3. Clear CMOS. 4. Verify that the monitor is attached and turned on. 5. Replace the graphics controller.
510—Splash Screen image corrupted	Splash Screen image has errors.	Install latest version of ROMPaq to restore image.
511—CPU0 or CPU1 Fan not detected	Fan is not connected or might have malfunctioned.	<ol style="list-style-type: none"> 1. Reseat fan cable. 2. Reseat the fan. 3. Replace the fan.
512—Chassis, rear chassis, or front chassis fan not detected	Fan is not connected, might have malfunctioned.	<ol style="list-style-type: none"> 1. Reseat chassis, rear chassis, or front chassis fan cable. 2. Reseat chassis, rear chassis, or front chassis fan. 3. Replace chassis, rear chassis, or front chassis fan.
601—Diskette Controller Error	Diskette controller circuitry or diskette drive circuitry incorrect.	<ol style="list-style-type: none"> 1. Run Computer Setup (F10 Setup). 2. Check and replace cables. 3. Clear CMOS. 4. Replace diskette drive. 5. Replace the system board.
605—Diskette Drive Type Error	Mismatch in drive type.	<ol style="list-style-type: none"> 1. Run Computer Setup (F10 Setup). 2. Disconnect any other diskette controller devices (tape drives). 3. Clear CMOS.

Table 5-18 POST Error Messages (continued)

Screen Message	Probable Cause	Recommended Action
611—Primary Diskette Port Address Assignment Conflict	Configuration error.	<ol style="list-style-type: none"> 1. Run Computer Setup (F10 Setup). 2. Remove expansion cards. 3. Clear CMOS.
912—Computer Cover Has Been Removed Since Last System Start Up	Access panel has been removed.	No action required.
917—Front Audio Not Connected	The front audio cable is not connected.	Connect front audio cable.
918—Front USB Not Connected	Front USB is not connected.	Connect front USB cable.
921—Device in PCI Express Slot failed to initialize	PCI Express cards not seated properly.	Reseat all PCI Express cards in their PCI Express slots. If the problem persists, contact the PCI Express card vendor.
940—Extended ROM signature not found	The signature at the start of the ROM flash is missing. Your firmware (BIOS) is incomplete.	Run ROMPaq again.
960—CPU Overtemp occurred	The ambient temperature could exceed operating limits (maximum=95°F), or there are obstructions to airflow, including dust build up.	<ol style="list-style-type: none"> 1. Be sure you are not operating the system in an environment that exceeds 95°F. 2. Disconnect power and open the access panel. 3. Check that cables are not blocking CPU heatsink fans or front fan, if installed. 4. Check that there is not excessive dust on major components. 5. If airflow is acceptable and there is not excessive dust, the thermal sensing circuitry has failed on the processors or on the system board. You must replace the processors, system board, or both.
1155—Serial Port Address Conflict Detected	Both external and internal serial ports are assigned to same IRQ.	<ol style="list-style-type: none"> 1. Remove any Comm port expansion cards. 2. Clear CMOS. 3. Reconfigure card resources and run Computer Setup (F10 Setup). Run Computer Setup or Windows utilities.
1720 SMART Hard Drive Detect Imminent Failure	Hard drive is about to fail. (Some hard drives have a firmware patch that will fix an erroneous error message.)	<ol style="list-style-type: none"> 1. Determine if hard drive is giving correct error message. Run the Drive Protection System test, if applicable. 2. Apply firmware patch if applicable (see http://www.hp.com/support). 3. Back up contents and replace hard drive.
1721—SMART SCSI Hard Drive detects imminent failure	Hard drive is about to fail. (Some hard drives have a firmware patch that will fix an erroneous error message.)	<ol style="list-style-type: none"> 1. Determine if hard drive is giving correct error message. Run the Drive Protection System test if applicable. 2. Apply firmware patch if applicable (see http://www.hp.com/support). 3. Back up contents and replace hard drive.
1780—Disk 0 Failure	The drive is not installed correctly or has failed.	<ol style="list-style-type: none"> 1. Make sure that any jumpers are set correctly, and that power and drive cables are connected, both to the drive and the system board. 2. Verify that the cables are the correct cables for your computer model. <p>If this message persists, you might need service for your workstation.</p>
1781—Disk 1 Failure	The drive is not installed correctly or has failed.	<ol style="list-style-type: none"> 1. Make sure that any jumpers are set correctly, and that power and drive cables are connected, both to the drive and the system board. 2. Verify that the cables are the correct cables for your computer model. <p>If this message persists, you may need service for your workstation.</p>

Table 5-18 POST Error Messages (continued)

Screen Message	Probable Cause	Recommended Action
1782—Disk Controller Failure	Hard drive circuitry error.	<ol style="list-style-type: none"> 1. Run Computer Setup (F10 Setup). 2. Clear CMOS. 3. Check cable seating/jumper settings. 4. Run hard drive diagnostics. 5. Disconnect additional drives. 6. Run the Drive Protection System test, if available. 7. Replace the hard drive. 8. Replace the system board.
1790—Disk 0 Error	The drive is not installed correctly or has failed.	<ol style="list-style-type: none"> 1. Make sure that any jumpers are set correctly, and that power and drive cables are connected, both to the drive and the system board. 2. Verify that the cables are the correct cables for your computer model. <p>If this message persists, you might need service for your workstation.</p>
1791—Disk 1 Error	The drive is not installed correctly or has failed.	<ol style="list-style-type: none"> 1. Make sure that any jumpers are set correctly, and that power and drive cables are connected, both to the drive and the system board. 2. Verify that the cables are the correct cables for your computer model. <p>If this message persists, you might need service for your workstation.</p>
1792—Secondary Disk Controller Failure	Hard drive circuitry error.	<ol style="list-style-type: none"> 1. Run Computer Setup (F10 Setup). 2. Clear CMOS. 3. Check cable seating/jumper settings. 4. Run hard drive diagnostics. 5. Disconnect additional drives. 6. Run the Drive Protection System test, if available. 7. Replace the hard drive.
1793—Secondary Controller or Disk Failure	Hard drive circuitry error.	<ol style="list-style-type: none"> 1. Run Computer Setup (F10 Setup). 2. Clear CMOS. 3. Check cable seating/jumper settings. 4. Run hard drive diagnostics. 5. Disconnect additional drives. 6. Run the Drive Protection System test, if available. 7. Replace the hard drive.
1794—Inaccessible devices attached to primary IDE controller	Devices attached to the primary IDE controller are inaccessible while the SATA controller is set to "Replace Primary IDE Controller" in Setup.	<ol style="list-style-type: none"> 1. Run Computer Setup (F10 Setup). 2. Select Storage > Storage Options and set SATA controller to Add as Separate Controller.
1800—Temperature Alert	Internal temperature exceeds specification.	<ol style="list-style-type: none"> 1. Check that workstation air vents are not blocked and cooling fan is running. 2. Verify processor speed selection. 3. Replace the processor. 4. Replace the system board.
1801—Microcode Patch Error	Processor not supported by ROM BIOS.	Upgrade BIOS to proper version.
1802—Processor Not Supported	The system board does not support the processor.	Replace the processor with a compatible one.
1803—BIOS Update Needed for Processor	This BIOS revision does not support the installed processor.	Install the latest BIOS located at http://www.hp.com .
Invalid Electronic Serial Number	Electronic serial number has become corrupted.	<p>Run Computer Setup. If Setup already has data in the field or will not allow the serial number to be entered, download from http://www.hp.com and run SP5572.EXE (SNZERO.EXE).</p> <p>Run Computer Setup and try to enter serial number under Security, System ID, then save changes.</p>

Table 5-18 POST Error Messages (continued)

Screen Message	Probable Cause	Recommended Action
ECC Multiple Bit Error Detected in Memory Module	Chipset has detected more than one bad bit in a 64-bit quadword of the memory array.	Replace the memory module.
Parity Check 2	Parity RAM failure.	Run Computer Setup and Diagnostic utilities.

A SATA Devices

This appendix provides additional information for setting up your SATA hard drives.

- [Section A.1 "SATA Guidelines"](#)
- [Section A.2 "SATA RAID Configurations"](#)

A.1 SATA Guidelines

 **NOTE:** These systems support a mixed configuration of SCSI and SATA hard drives. The HP xw4300 Workstation does not support IDE hard drives.

When installing and operating SATA devices:

- Connect the SATA hard drive from the system board to the hard drive with the SATA cable (326965-006).
- If using a SATA controller card, connect the 4-4 pin LED cable (included with SATA controller board) from the card header "JP1" (4-pin header) to the system board header labeled "HD LED" (4-pin header at P29).

For complete and current information on supported accessories and components, visit <http://partsurfer.hp.com>.


A.2 SATA RAID Configurations

This workstation supports an embedded SATA RAID. Redundant Array of Inexpensive Disks (RAID) combines multiple physical drives together to provide either increased performance or increased redundancy.

For an embedded SATA RAID, there are three primary configurations.

- RAID 0 is a striping configuration. For example, this combines two 80GB drives into one 160GB drive. Both physical drives can be accessed simultaneously for better performance. This is faster than using two 80GB drives separately.
- RAID 1 is a mirroring configuration. For example, this uses two 80GB drives, but one drive is a complete mirror of the other drive. The system remains functional and no data is lost if one of the drives should fail.
- RAID 0 + 1 is a combination of RAID 0 and RAID 1. The controller combines the performance of data striping (RAID 0) and the fault tolerance of disk mirroring (RAID 1). Data is striped across multiple drives and duplicated on another set of drives.
- RAID 5 is data striping with rotating parity. For example, three 80GB drives offer 160GB of usable storage, with the third 80GB drive used to store parity information. Data can be fully recovered if any one of the three drives fail.

There are other RAID configurations, but they are not supported on an embedded SATA RAID.

 **NOTE:** For information on the integrated SATA RAID, visit <http://www.hp.com/go/workstationsupport> and review the supplier's documentation and *HP User Manual for the Integrated NVIDIA SATA RAID Array for Microsoft® Windows® XP Professional*. For information on supported SATA RAID configurations, visit <http://www.hp.com/go/productbulletin>.

B SCSI Devices


This appendix provides more information for setting up your SCSI hard drive.

- [Section B.1 "SCSI Guidelines"](#)
- [Section B.2 "Using SCSISelect with SCSI Devices"](#)
- [Section B.3 "SMART"](#)
- [Section B.4 "Jumpers"](#)

B.1 SCSI Guidelines

When installing and operating SCSI devices, you must follow these guidelines:


- A wide (68-pin) SCSI controller with two channels, one for internal devices and one for external devices. Five internal SCSI devices are supported.
- If multiple SCSI devices are used, split the devices between Channels A and B for optimum performance. Cable length for the second channel should not be longer than 18 inches.

 **CAUTION:** Do not route data cables near the air intake to the power supply. Cables routed in this manner can block the airflow and cause the workstation to overheat.

- All SCSI controllers require a unique SCSI ID (0–15) for each SCSI device installed. Refer to [section B.4](#) for more information.
- Every SCSI chain or circuit must be terminated (closed) at both ends. Some system boards have both ends of the SCSI cable connected to, and terminated by, the system board. Termination can be accomplished in one of several ways:
 - Use a cable with a built-in terminator.
 - Use a cable with a terminating resistor plug in the last connector.
 - Connect a SCSI device with its termination enabled into the last connector.
 - Connect an external SCSI device with its termination enabled to the external SCSI connector on the rear panel of the workstation.
- Turn on all external SCSI devices before turning on the power to the workstation. This enables the SCSI controller to recognize the external devices.

B.2 Using SCSISelect with SCSI Devices

The Ultra160 and faster SCSI host adapters include the SCSISelect utility to configure the host adapter and to run the SCSI disk utilities. To run the SCSISelect utility:

 **NOTE:** The onboard LSI SCSI controller on the xw4300 has an “LSI Logic Configuration Utility” that you access through **Ctrl-C** when the LSI option ROM is initializing.

- In POST Messages Enabled mode: Press **Ctrl+A** when the “Press<Ctrl><A> for SCSISelect Utility” message appears during POST. The utility will only be present if an Adaptec SCSI card is present.
- In POST Messages Disabled mode: When the HP logo screen appears, press any key to exit the logo screen. Immediately after exiting the logo screen, press **Ctrl+A** to access the SCSISelect utility. The utility will only be present if an Adaptec SCSI card is present.

A menu appears with the following options:

- Configure/View Host Adapter Settings
 - SCSI Bus Interface Definitions
 - Host Adapter SCSI ID
 - SCSI Parity Checking
 - Host Adapter SCSI Termination
 - Additional Options
 - Boot Device Options
 - SCSI Device Configuration
 - Advanced Configuration Options
- SCSI Disk Utilities
 - Lists all SCSI devices and SCSI ID numbers

 **NOTE:** For additional information about configuring POST message display status, refer to [section 3.1.3 “Computer Setup Menu”](#).

B.3 SMART

The SMART SCSI hard drives for HP workstations have built-in drive failure prediction that warns the user or the network administrator of an impending failure or crash of the hard drive. SMART drives track fault prediction and failure indication parameters, such as re-allocated sector count, spin retry count, and calibration retry count. If the drive determines that a failure is imminent, it generates a fault alert.

B.4 Jumpers

All SCSI controllers require a unique SCSI ID (0–15) for each SCSI device installed.

The controller identifies a SCSI device by its SCSI ID number rather than its location. Moving a SCSI device from one position to another on the SCSI chain does not affect communication between the controller and the device. The reserved and available SCSI ID numbers are displayed in the following list:

- 0 is reserved for the primary hard drive (Windows only).
- 7 is reserved for the SCSI controller.
- 1 through 6 and 8 through 15 are available for all other SCSI devices.

When 0 is used for the primary hard drive, set the second hard drive to 1, the third to 2, and so on.

To set the SCSI ID on a drive, see the instructions on top/back of the hard drive for the correct jumper settings. The drive probably displays a diagram of the jumper block. This diagram shows you which blocks to cover with your jumper to get the desired ID.

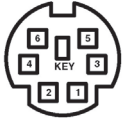
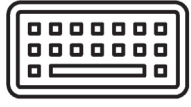
For example, if the drive must be set to 3, the drive might show that the 4 ID bits are at the far left of the connector (ID0, ID1, ID2, and ID3), then using the jumpers provided, cover the pins to set the SCSI ID.

C Connector Pins

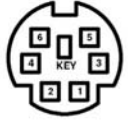

This appendix provides pin information for your system:

- [Section C.1 "Enhanced Keyboard"](#)
- [Section C.2 "Mouse"](#)
- [Section C.3 "Ethernet RJ-45"](#)
- [Section C.4 "Serial Interface"](#)
- [Section C.5 "USB"](#)
- [Section C.6 "IEEE 1394"](#)
- [Section C.7 "Microphone"](#)
- [Section C.8 "Headphone"](#)
- [Section C.9 "Line-in Audio"](#)
- [Section C.10 "Line-out Audio"](#)
- [Section C.11 "Ultra SCSI"](#)
- [Section C.12 "SATA"](#)
- [Section C.13 "Monitor \(VGA\)"](#)
- [Section C.16 "24-Pin Power \(Main\)"](#)
- [Section C.17 "4-Pin Power \(for Processors\)"](#)


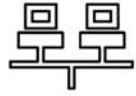
C.1 Enhanced Keyboard

Keyboard Connector	Pin	Signal
 	1	Data
	2	Unused
	3	Ground
	4	+5 VDC
	5	Clock
	6	Unused

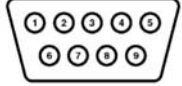

C.2 Mouse

Mouse Connector	Pin	Signal
 	1	Data
	2	Unused
	3	Ground
	4	+5 VDC
	5	Clock
	6	Unused



C.3 Ethernet RJ-45

Ethernet Connector	Pin	Signal
 	1	(+) Transmit Data
	2	(-) Transmit Data
	3	(+) Receive Data
	4	Unused
	5	Unused
	6	(-) Receive Data
	7	Unused
	8	Unused

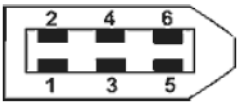
C.4 Serial Interface

Serial Connector	Pin	Signal
 	1	Carrier Detect
	2	Receive Data
	3	Transmit Data
	4	Data Terminal Ready
	5	Signal Ground
	6	Data Set Ready
	7	Request to Send
	8	Clear to Send
	9	Ring Indicator

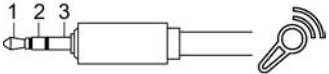
C.5 USB

USB Connector	Pin	Signal
 	1	+5 VDC
	2	- Data
	3	+ Data
	4	Ground

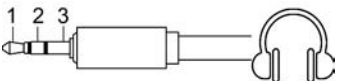
C.6 IEEE 1394

IEEE 1394 Connector	Pin	Signal
	1	power
	2	gnd
	3	tpb-
	4	tpb+
	5	tpa-
	6	tpa+

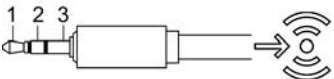
C.7 Microphone

Microphone Connector (1/8 inch)	Pin	Signal
	1 (Tip)	Audio
	2 (Ring)	Power
	3 (Shield)	Ground

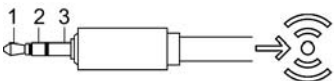
C.8 Headphone

Headphone Connector (1/8 inch)	Pin	Signal
	1 (Tip)	Audio_Left
	2 (Ring)	Audio_Right
	3 (Shield)	Ground

C.9 Line-in Audio

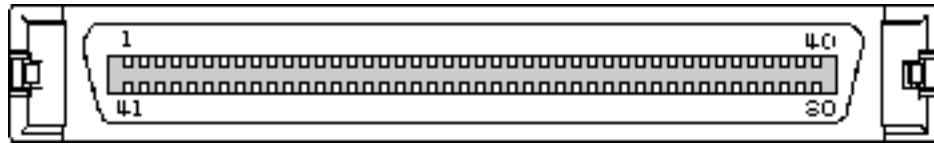
Line-in Audio Connector (1/8 inch)	Pin	Signal
	1 (Tip)	Audio_In_Left
	2 (Ring)	Audio_In_Right
	3 (Shield)	Ground

C.10 Line-out Audio

Line-out Audio Connector (1/8 inch)	Pin	Signal
	1 (Tip)	Audio_Out_Left
	2 (Ring)	Audio_Out_Right
	3 (Shield)	Ground

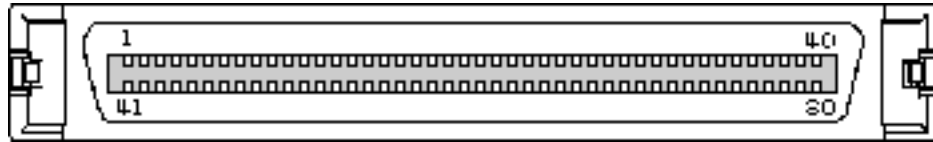
C.11 Ultra SCSI

Ultra SCSI 80-pin connector



Pin	Signal	Pin	Signal
1	12V	41	12V GROUND
2	12V	42	12V GROUND
3	12V	43	12V GROUND
4	12V	44	MATED 1
5	3.3V	45	3.3V CHARGE
6	3.3V	46	DIFFSENS
7	-DB(11)	47	+DB(11)
8	-DB(10)	48	+DB(10)
9	-DB(9)	49	+DB(9)
10	-DB(8)	50	+DB(8)
11	-I/O	51	+I/O
12	-REQ	52	+REQ
13	-C/D	53	+C/D
14	-SEL	54	+SEL
15	-MSG	55	+MSG
16	-RST	56	+RST
17	-ACK	57	+ACK
18	-BSY	58	+BSY
19	-ATN	59	+ATN
20	-P_CRCA	60	+P_CRCA
21	-DB(7)	61	+DB(7)
22	-DB(6)	62	+DB(6)
23	-DB(5)	63	+DB(5)
24	-DB(4)	64	+DB(4)
25	-DB(3)	65	+DB(3)
26	-DB(2)	66	+DB(2)
27	-DB(1)	67	+DB(1)
28	-DB(0)	68	+DB(0)
29	-DB(P1)	69	+DB(P1)
30	-DB(15)	70	+DB(15)
31	-DB(14)	71	+DB(14)
32	-DB(13)	72	+DB(13)
33	-DB(12)	73	+DB(12)
34	5V	74	MATED 2
35	5V	75	5V GROUND
36	5V CHARGE	76	5V GROUND

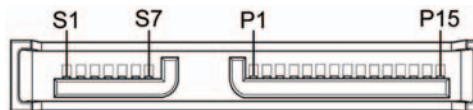
Ultra SCSI 80-pin connector



Pin	Signal	Pin	Signal
37	SPINDLE SYNC	77	ACTIVE LED OUT
38	RMT_START	78	DLYD_START
39	SCSI ID (0)	79	SCSI ID (1)
40	SCSI ID (2)	80	SCSI ID (3)

C.12 SATA

SATA Connector

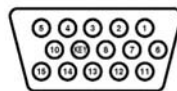


Pin	Signal	Pin	Signal	Pin	Signal
Data Cable		Power Cable		Power Cable	
S-1	Ground	P-1	3.3-V power	P-8	5-V power
S-2*	A+	P-2	3.3-V power	P-9	5-V power
S-3*	A-	P-3	3.3-V power	P-10	Ground
S-4	Ground	P-4	Ground	P-11	Reserved
S-5**	B-	P-5	Ground	P-12	Ground
S-6**	B+	P-6	Ground	P-13	12-V power
S-7	Ground	P-7	5-V power	P-14	12-V power
* S2 and S3 differential signal pair				P-15	12-V power
** S5 and S6 differential signal pair					

C.13 Monitor (VGA)

 **NOTE:** Monitor connectors can vary depending on your configuration.

VGA Connector

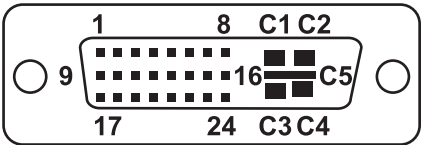


Pin	Signal	Pin	Signal	Pin	Signal
1	Red Analog	6	Ground	11	Monitor ID
2	Green Analog	7	Ground	12	DDC Serial Data
3	Blue Analog	8	Ground	13	Horizontal Sync
4	Monitor ID	9	+5V DC	14	Vertical Sync
5	Ground	10	Ground	15	DDC Serial Clock

C.14 Monitor (DVI)

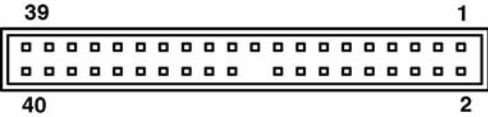
 **NOTE:** Monitor connectors can vary depending on your configuration.

DVI Connector

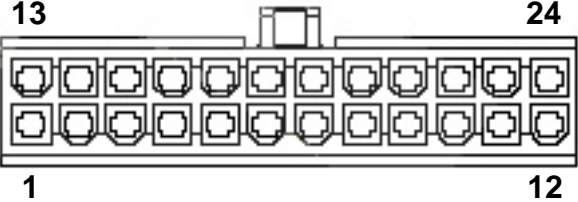


Pin	Signal	Pin	Signal
1	T.M.D.S DATA 2-	16	HOT PLUG DETECT
2	T.M.D.S DATA 2+	17	T.M.D.S DATA 0-
3	T.M.D.S DATA 2/4 SHIELD	18	T.M.D.S DATA 0+
4	T.M.D.S DATA 4-	19	T.M.D.S DATA 0/5 SHIELD
5	T.M.D.S DATA 4+ 2	0	T.M.D.S DATA 5-
6	DDC CLOCK	21	T.M.D.S DATA 5+
7	DDC DATA	22	T.M.D.S CLOCK SHIELD
8	ANALOG VERT. SYNC	23	T.M.D.S CLOCK+
9	T.M.D.S DATA 1-	24	T.M.D.S CLOCK-
10	T.M.D.S DATA 1+	C1	ANALOG RED
11	T.M.D.S DATA 1/3 SHIELD	C2	ANALOG GREEN
12	T.M.D.S DATA 3-	C3	ANALOG BLUE
13	T.M.D.S DATA 3+	C4	ANALOG HORZ SYNC
14	+5V POWER	C5	ANALOG GROUND
15	GND		

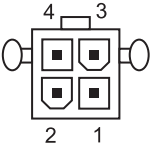
C.15 ATA/ATAPI (IDE) Standard Drive Cable

ATA/ATAPI (IDE) Connector					
					
Pin	Signal	Pin	Signal	Pin	Signal
1	Reset	15	DD1	29	DMAK
2	Ground	16	DD14	30	Ground
3	DD7	17	DD0	31	INTRQ
4	DD8	18	DD15	32	IOCS16
5	DD6	19	Ground	33	DA1
6	DD9	20	(Key)	34	PDIAG (cable detect)
7	DD5	21	DMARQ	35	DA0
8	DD10	22	Ground	36	DA2
9	DD4	23	DIOW	37	CS1FX
10	DD11	24	Ground	38	CS3FX
11	DD3	25	DIOR	39	DASP
12	DD12	26	Ground	40	Ground
13	DD2	27	IORDY		
14	DD13	28	CSEL		

C.16 24-Pin Power (Main)

24-Pin Main Power Connector					
					
1	+3.3 V	8	POK	14	-12 V
2	+3.3 V	9	+5 Vaux	15	GND
3	GND	10	+12 V-A	16	PS_ON_L
4	+5 V	11	+12 V-A	17	GND
5	GND	12	+3.3 V	18	GND
6	+5 V	13	+3.3 V and +3.3V-Rsense	19	GND
7	GND			20	
				21	+5 V
				22	+5 V and +5 V-Rsense
				23	+5 V
				24	GND

C.17 4-Pin Power (for Processors)

4-Pin Power (for CPUs)		Pin	Output	AWG	Wire Color
		1	GND	18	Black
		2	GND	18	Black
		3	V12-CPU	18	White
		4	V12-CPU	18	White

D System Board Designators

This appendix lists the system board designators for this system.

Table D-19 System Board Designators

Designator	Silkscreen	Component
MH01-MH10	N/A	Mounting holes
CR1	5V_AUX	LED: 5V_AUX power indicator
N/A	N/A	Power LED
E14	N/A	Boot block header/jumper
E49	N/A	Clear password header/jumper
J41	SLOT1 PCI-E X16	PCI Express slot
J20	SLOT2 PCI	PCI slot
J32	SLOT3 PCI-E X8' (X4)	PCI Express slot
J31	SLOT4 PCI-E X1	PCI Express slot
J21	SLOT5 PCI	PCI slot
J22	SLOT6 PCI	PCI slot
J50	PARALLEL	Parallel port
J68	KBD_MSE	Stacked keyboard/mouse connector
J9	RJ/USB	Stacked RJ45/Dual USB
J10	QUAD USB	Quad stacked USB
J83	AUDIO	Triple stacked audio jack
P1	P/S	Power supply connector (24 pin)
P3	N/A	Processor 12V header
P10	FDD	Diskette drive connector
P11	AUX-IN	Auxiliary audio connector
P124	HOOD LOCK	Hood lock header
P125	HD SENSE	Hood sensor header
P20	IDE	Primary IDE connector
P23	FRONT AUDIO	Front panel audio header
P24	FRONT USB	Front panel USB header
P29	HDD LED	HDD LED connector
P60	SATA0	Primary serial ATA (SATA) connector
P61	SATA1	Second serial ATA (SATA) connector
P62	SATA2	Third serial ATA (SATA) connector
P63	SATA3	Fourth serial ATA (SATA) connector
P5	CONTROL PANEL	Main power/HDD LED connector
P52	SERIAL B	Flying serial port header
P53	SERIAL A	Serial port
P6	SPK	Speaker connector
P70	CPU FAN	CPU fan header
P8	SYS FAN	Primary chassis fan header
P9	PCI FAN	Secondary chassis fan header
SW50	CMOS	Clear CMOS switch/push button

Table D-19 System Board Designators

Designator	Silkscreen	Component
XBT2	BATTERY	Battery retainer
XMM1	DIMM1	Memory slot
XMM2	DIMM2	Memory slot
XMM3	DIMM3	Memory slot
XMM4	DIMM4	Memory slot
XU1	CPU	Processor socket

E Power Cord Set Requirements

The power supplies on some computers have external power switches. The voltage select switch feature on the computer permits it to operate from any line voltage between 100–120 or 220–240 volts AC. Power supplies on those computers that do not have external power switches are equipped with internal switches that sense the incoming voltage and automatically switch to the proper voltage.

The power cord set received with the computer meets the requirements for use in the country where you purchased the equipment.

Power cord sets for use in other countries must meet the requirements of the country where you use the computer. For more information on power cord set requirements, contact your authorized HP dealer, reseller, or service provider.

E.1 General Requirements

The requirements listed below are applicable to all countries:

- The power cord must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be installed.
- The power cord set must have a minimum current capacity of 10A (7A Japan only) and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
- The diameter of the wire must be a minimum of 0.75 mm² or 18AWG, and the length of the cord must be between 1.8 m (6 feet) and 3.6 m (12 feet).

The power cord should be routed so that it is not likely to be walked on or pinched by items placed upon it or against it. Particular attention should be paid to the plug, electrical outlet, and the point where the cord exits from the product.

⚠ **WARNING!** Do not operate this product with a damaged power cord set. If the power cord set is damaged in any manner, replace it immediately.

E.1.1 Japanese Power Cord Requirements

For use in Japan, use only the power cord received with this product.

⚠ **CAUTION:** Do not use the power cord received with this product on any other products.

E.1.2 Country-Specific Requirements

Additional requirements specific to a country are shown in parentheses and explained below.

Country	Accrediting Agency	Country	Accrediting Agency
Australia (1)	EANSW	Italy (1)	IMQ
Austria (1)	OVE	Japan (3)	METI
Belgium (1)	CEBC	Norway (1)	NEMKO
Canada (2)	CSA	Sweden (1)	SEMKO
Denmark (1)	DEMKO	Switzerland (1)	SEV
Finland (1)	SETI	United Kingdom (1)	BSI
France (1)	UTE	United States (2)	UL
Germany (1)	VDE		

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 0.75mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.
2. The flexible cord must be Type SVT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15A, 125V) or NEMA 6-15P (15A 250V) configuration.
3. Appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. Flexible cord must be Type VCT or VCTF, 3-conductor, 0.75 mm² conductor size. Wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7A, 125V) configuration.

F Routine Care

This appendix contains the additional information for caring for your system:

- [Section F.1 "General Cleaning Safety Precautions"](#)
- [Section F.2 "Maximizing the Airflow"](#)
- [Section F.3 "Cleaning the Workstation Case"](#)
- [Section F.4 "Cleaning the Keyboard"](#)
- [Section F.5 "Cleaning the Monitor"](#)
- [Section F.6 "Cleaning the Mouse"](#)

F.1 General Cleaning Safety Precautions

- Never use solvents or flammable solutions to clean the workstation.
- Never immerse any parts in water or cleaning solutions; apply any liquids to a clean cloth and then use the cloth on the component.
- Always unplug the workstation when cleaning with liquids or damp cloths.
- Always unplug the workstation before cleaning the keyboard, mouse, or air vents.
- Disconnect the keyboard before cleaning it.
- Wear safety glasses equipped with side shields when cleaning the keyboard.

F.2 Maximizing the Airflow

Keep your workstation in an area where the airflow to the front and rear of the system is not obstructed.

- If possible, keep the unit off of surfaces where dust can gather.
- Keep the back of the unit at least 6 inches away from a wall or other obstruction.
- Keep the front of the unit clear of any obstruction that keeps air from entering the front of the system.
- Remove any dust on the front panel (vent area) and the rear fans with a small vacuum, compressed air, or dust rag.

F.3 Cleaning the Workstation Case

Follow previously stated safety precautions before cleaning the workstation.

To clean the workstation case:

- To remove light stains or dirt, use plain water with a clean, lint-free cloth or swab.
- For stronger stains, use a mild dish-washing liquid diluted with water. Rinse well by wiping it with a cloth or swab dampened with clear water.
- For stubborn stains, use isopropyl (rubbing) alcohol. No rinsing is needed as the alcohol will evaporate quickly and not leave a residue.
- After cleaning, always wipe the unit with a clean, lint-free cloth.
- Occasionally clean the air vents on the workstation. Lint and other foreign matter can block the vents and limit the airflow.

F.4 Cleaning the Keyboard

Follow all safety precautions stated earlier before cleaning the keyboard.

△ **CAUTION:** Use safety glasses equipped with side shields before attempting to clean debris from under the keys.

- Visible debris underneath or between the keys can be removed by vacuuming or shaking.
 - Canned, pressurized air can be used to clean debris from under the keys. Caution should be used as too much air pressure can dislodge lubricants applied under the wide keys.
 - If you remove a key, use a specially designed key puller to prevent damage to the keys. This tool is available through many electronic supply outlets.
-

△ **CAUTION:** Never remove a wide leveled key (like the space bar) from the keyboard. If these keys are improperly removed or installed, the keyboard might not function properly.

- Cleaning under a key can be done with a swab moistened with isopropyl alcohol and squeezed out. Be careful not to wipe away lubricants necessary for proper key functions. Use tweezers to remove any fibers or dirt in confined areas. Allow the parts to air dry before reassembly.
-

F.5 Cleaning the Monitor

Follow all safety precautions stated earlier before cleaning the monitor.

To clean the monitor, wipe the monitor screen with a clean cloth moistened with water or with a towelette designed for cleaning monitors. Do not use sprays or aerosols directly on the screen; the liquid might seep into the housing and damage a component. Never use solvents or flammable liquids on the monitor.

F.6 Cleaning the Mouse

Follow all safety precautions stated earlier before cleaning the mouse.

To clean the mouse:

- Clean the mouse ball by first removing the retaining plate and the ball from the housing.
- Pull out any debris from the ball socket and wipe the ball with a clean, dry cloth before reassembly.

G Additional Password Security and Resetting CMOS

This workstation supports security password features, which can be established through the Computer Setup Security menu. These features are:

- setup password
- power-on password

When both passwords are set, the setup password can also be used in place of the power-on password as an override to log in to the workstation. This is a useful feature for a network administrator.

If you forget the password for the computer, there are two methods for clearing that password so you can gain access to the information on the workstation.

- resetting the password jumper
- using the Clear CMOS button

△ **CAUTION:** Pushing the CMOS button resets CMOS values to factory defaults and erases any customized information including passwords, asset numbers, and special settings. It is important to back up the workstation CMOS settings before resetting them in case they are needed later. To back up the CMOS settings, use Computer Setup and run the Save to Diskette option from the File menu.

G.1 Resetting the Password Jumper

To disable the power-on or setup password features and clear the power-on and setup passwords:

1. Shut down the operating system and then turn off the workstation and any external devices. Disconnect the power cord of the workstation and any external devices from the power outlets.
-
- ⚠ **WARNING!** To reduce the risk of personal injury from electrical shock and hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.
-
- ⚠ **CAUTION:** When the workstation is plugged in, the power supply always has voltage applied to the system board even when the unit is turned off. Failure to disconnect the power cord can result in damage to the system.
-
- ⚠ **CAUTION:** Static electricity can damage the electronic components of the workstation or optional equipment. Before beginning these procedures, be sure that you are discharged of static electricity by briefly touching a grounded metal object.
-
2. Open the access panel.
 3. Locate the password header and jumper. The password header is E49.
-
- 📝 **NOTE:** The password jumper is green so that it can be easily identified. For assistance locating the password jumper and other system board components, refer to “System Board” on page 55.
-
4. Remove the jumper. Place the jumper on either pin 1 or 2 (not both).
 5. Replace the access panel.
 6. Plug in the workstation and turn on the power. Allow the operating system to start. This clears the current passwords and disables the password features.
 7. To establish new passwords, repeat steps 1 through 3, replace the password jumper on **both** pins 1 and 2, then repeat steps 5 through 7. Establish the new passwords in Computer Setup.

G.2 Clearing and Resetting the CMOS

The CMOS of the workstation stores password information and information about the workstation configuration. This section describes the steps to successfully clear and reset the CMOS.

G.2.1 Using Computer Setup to Reset CMOS

To reset CMOS using Computer Setup, access the Computer Setup Utilities menu. When the Computer Setup message appears in the lower-right corner of the screen, press the **F10** key. Press **Enter** to bypass the title screen, if necessary.

- 📝 **NOTE:** If you do not press the **F10** key while the message is displayed, the workstation must be restarted to access the utility.

From the Computer Setup menu, select **File > Set Defaults** and **Exit**. This restores the soft settings that include boot sequence order and other factory settings. It does not, however, force hardware rediscovery.

- 📝 **NOTE:** The workstation passwords and any special configurations along with the system date and time will have to be reset.

G.2.2 Using the CMOS Button

- ⚠ **CAUTION:** Pushing the CMOS button resets CMOS values to factory defaults and erases any customized information including passwords, asset numbers, and special settings. It is important to back up the workstation CMOS settings before resetting them in case they are needed later. To back up the CMOS settings, use Computer Setup and run the Save to Diskette option from the File menu.


1. Shut down the operating system and then turn off the workstation and any external devices. Disconnect the power cord of the workstation and any external devices from the power outlets. The CMOS will not clear if the workstation remains connected to a power outlet.
-
- ⚠ **WARNING!** To reduce the risk of personal injury from electrical shock and hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.
-

△ **CAUTION:** When the workstation is plugged in, the power supply always has voltage applied to the system board even when the unit is turned off. Failure to disconnect the power cord can result in damage to the system.

△ **CAUTION:** Static electricity can damage the electronic components of the workstation or optional equipment. Before beginning these procedures, be sure that you are discharged of static electricity by briefly touching a grounded metal object.


2. Open the access panel.

3. Locate, press, and hold the CMOS button in for five seconds.

 **NOTE:** For assistance locating the CMOS button and other system board components, refer to “System Board” on page 55.

4. Replace the access panel.

5. Plug in the workstation power and turn the power back on.

 **NOTE:** The workstation passwords and any special configurations along with the system date and time will have to be reset.

H Quick Troubleshooting Flows

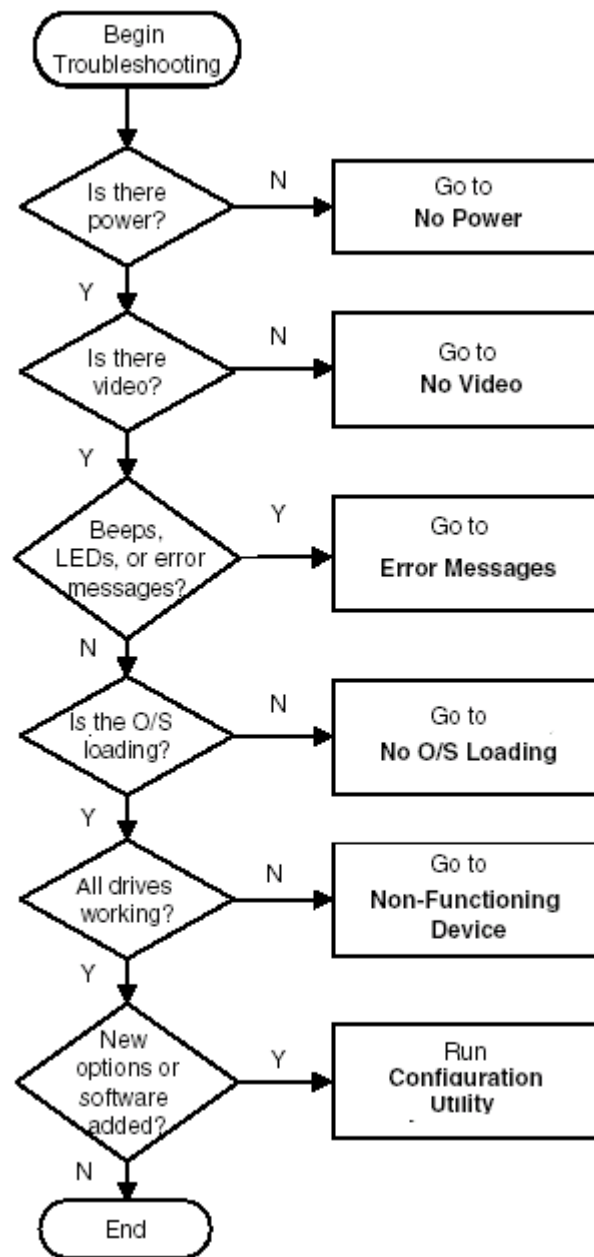
This appendix presents some quick troubleshooting flowcharts for some common issues.



NOTE: The flowcharts presented here are for general troubleshooting purposes only and they might not apply to your specific workstation.

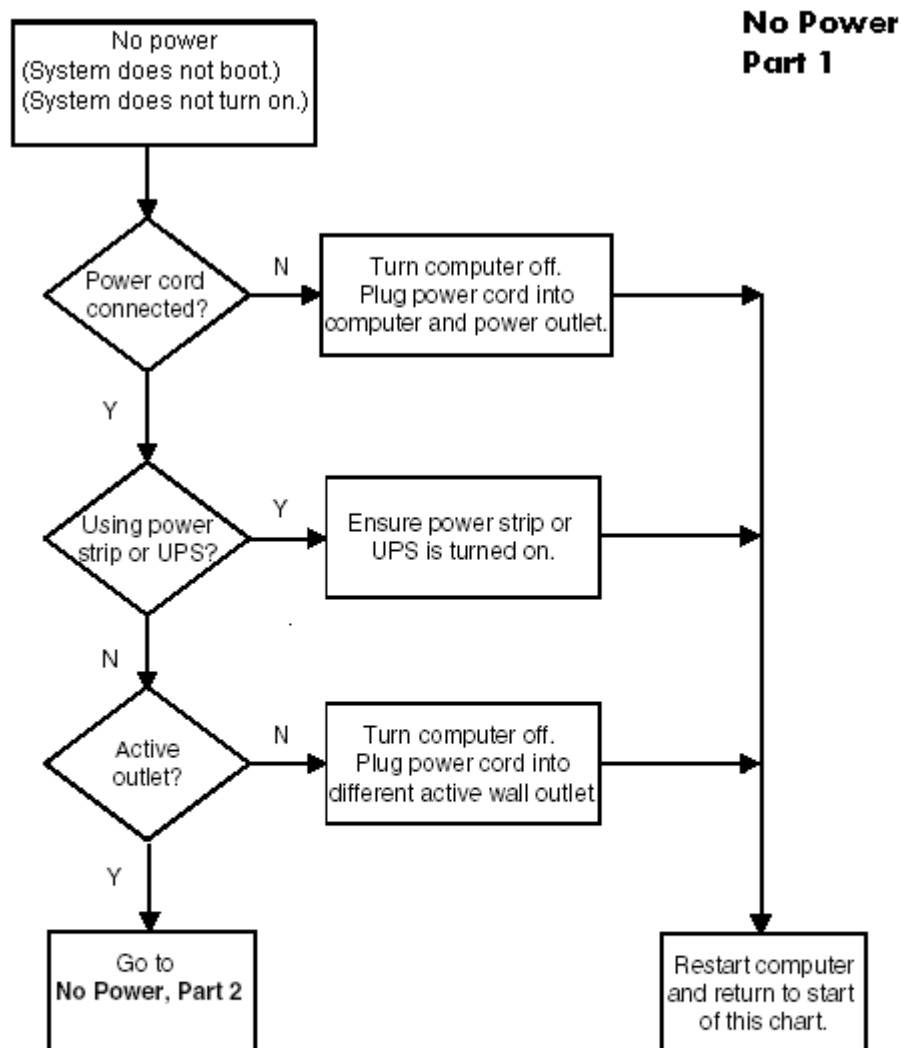
- [Section H.1 "Initial Troubleshooting"](#)
- [Section H.2 "No Power"](#)
- [Section H.3 "No Video"](#)
- [Section H.4 "Error Messages"](#)
- [Section H.5 "No OS Loading"](#)
- [Section H.6 "No OS Loading from Hard Drive"](#)
- [Section H.7 "No OS Loading from Diskette Drive"](#)
- [Section H.8 "No OS Loading from CD-ROM Drive"](#)
- [Section H.9 "No OS Loading from Network"](#)
- [Section H.10 "Non-functioning Device"](#)

H.1 Initial Troubleshooting



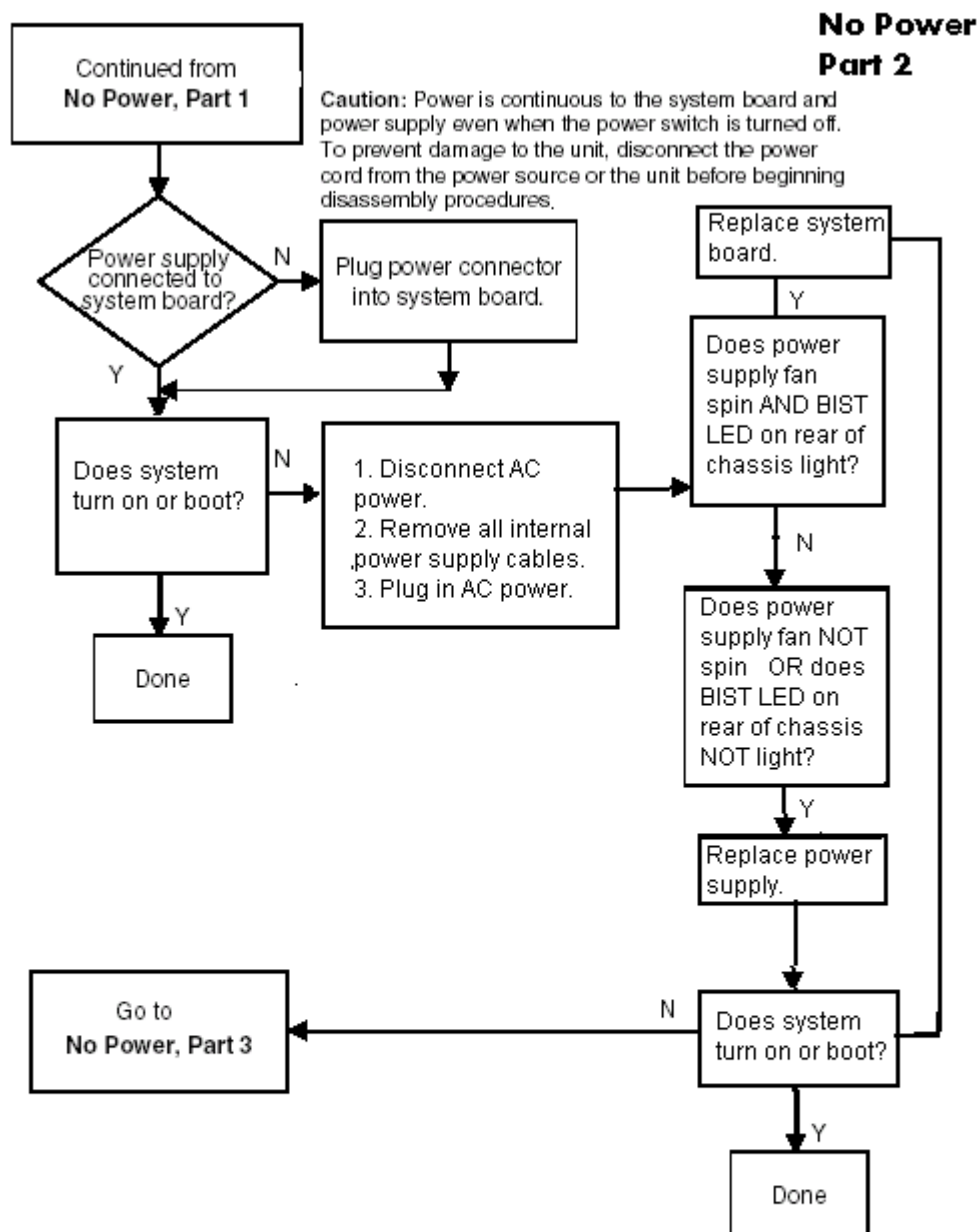
H.2 No Power

H.2.1 No Power, Part 1

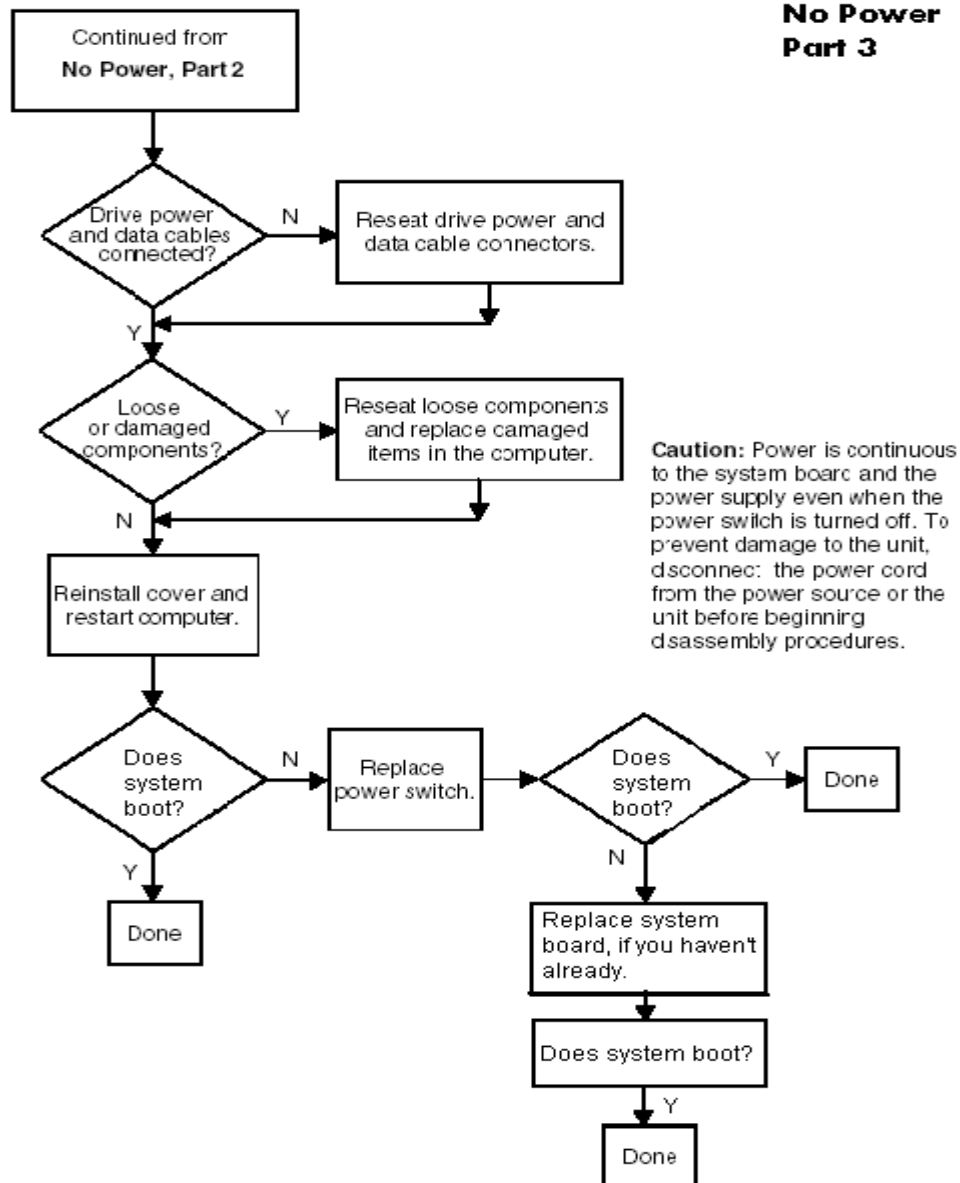


Caution: Power is continuous to the system board and power supply even when the power switch is turned off. To prevent damage to the unit, disconnect the power cord from the power source or the unit before beginning disassembly procedures.

H.2.2 No Power, Part 2



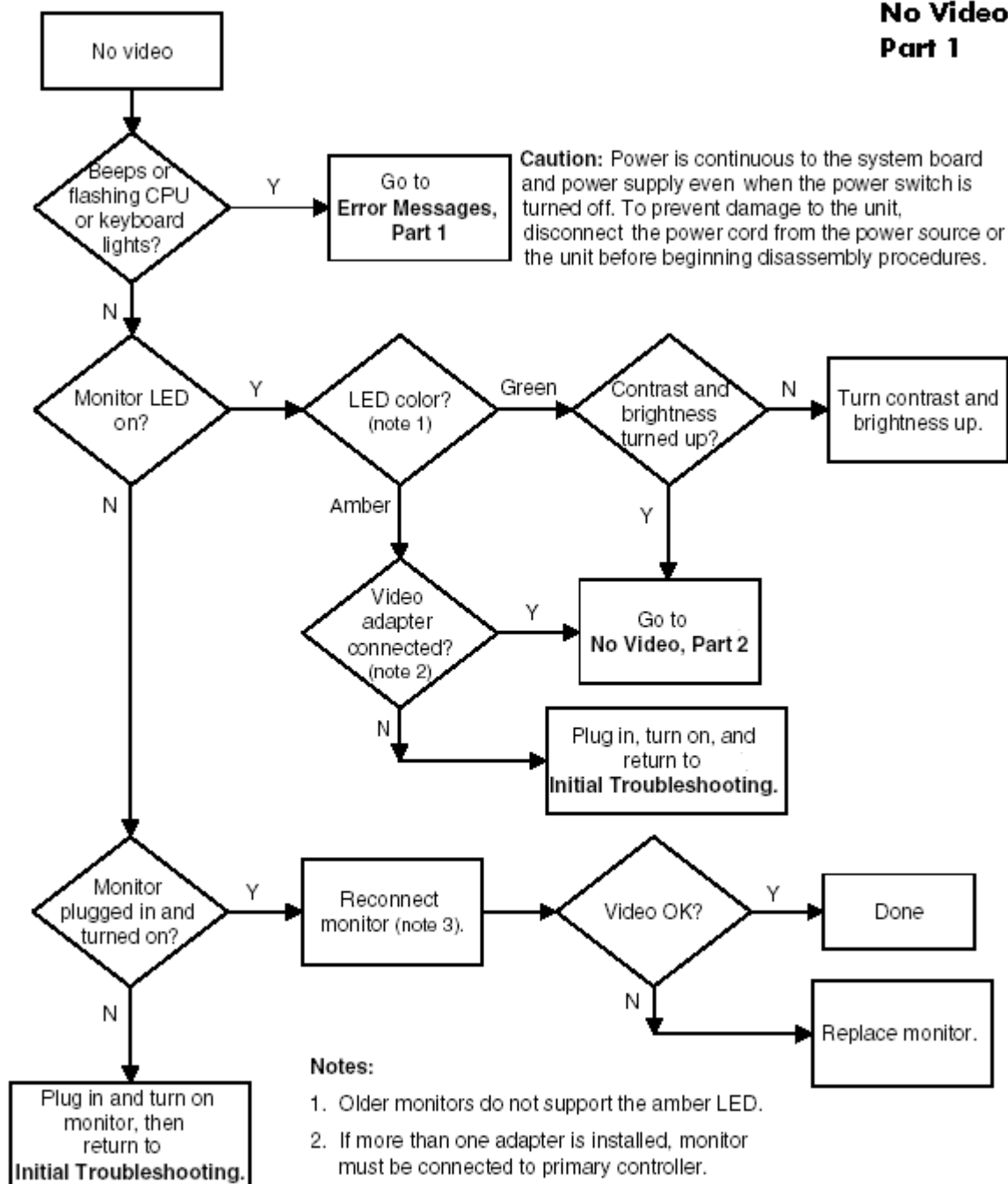
H.2.3 No Power, Part 3



H.3 No Video

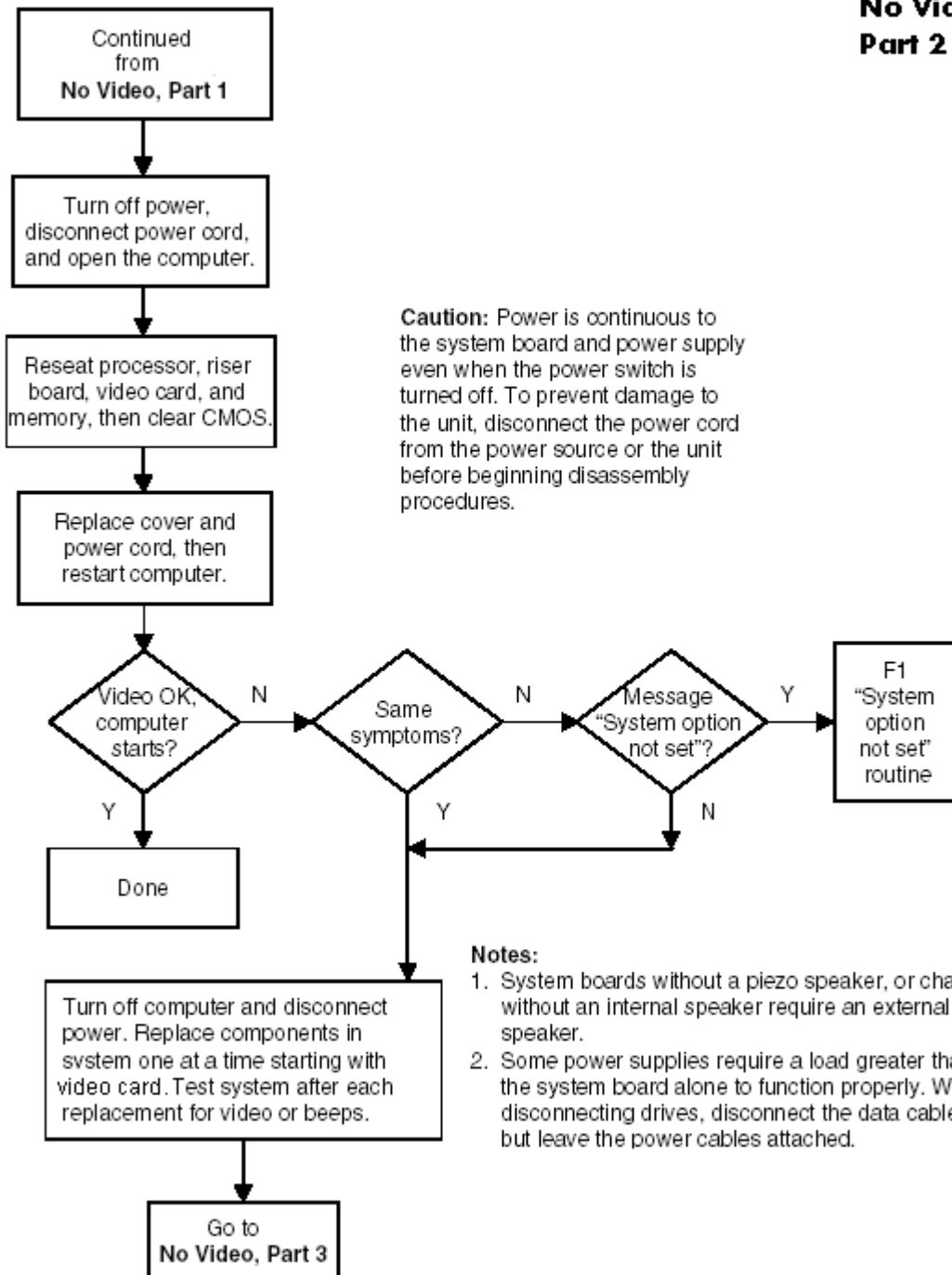
H.3.1 No Video, Part 1

No Video Part 1

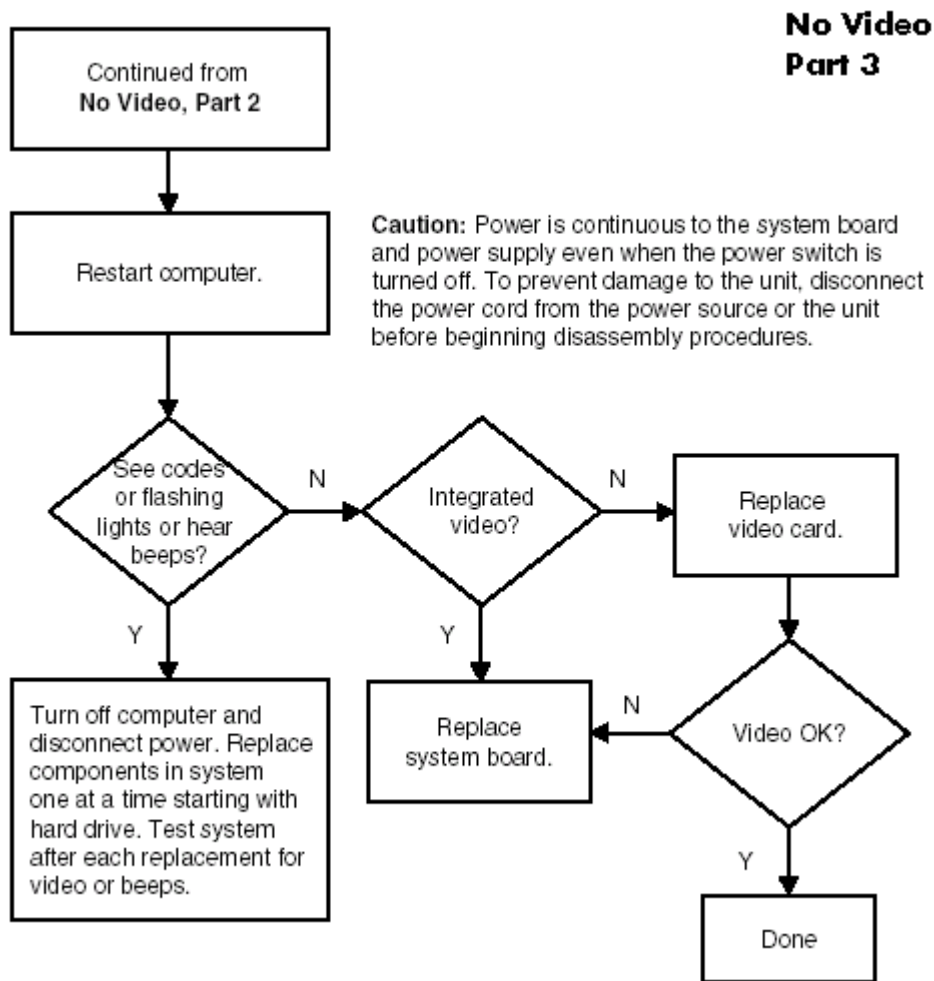


H.3.2 No Video, Part 2

No Video Part 2

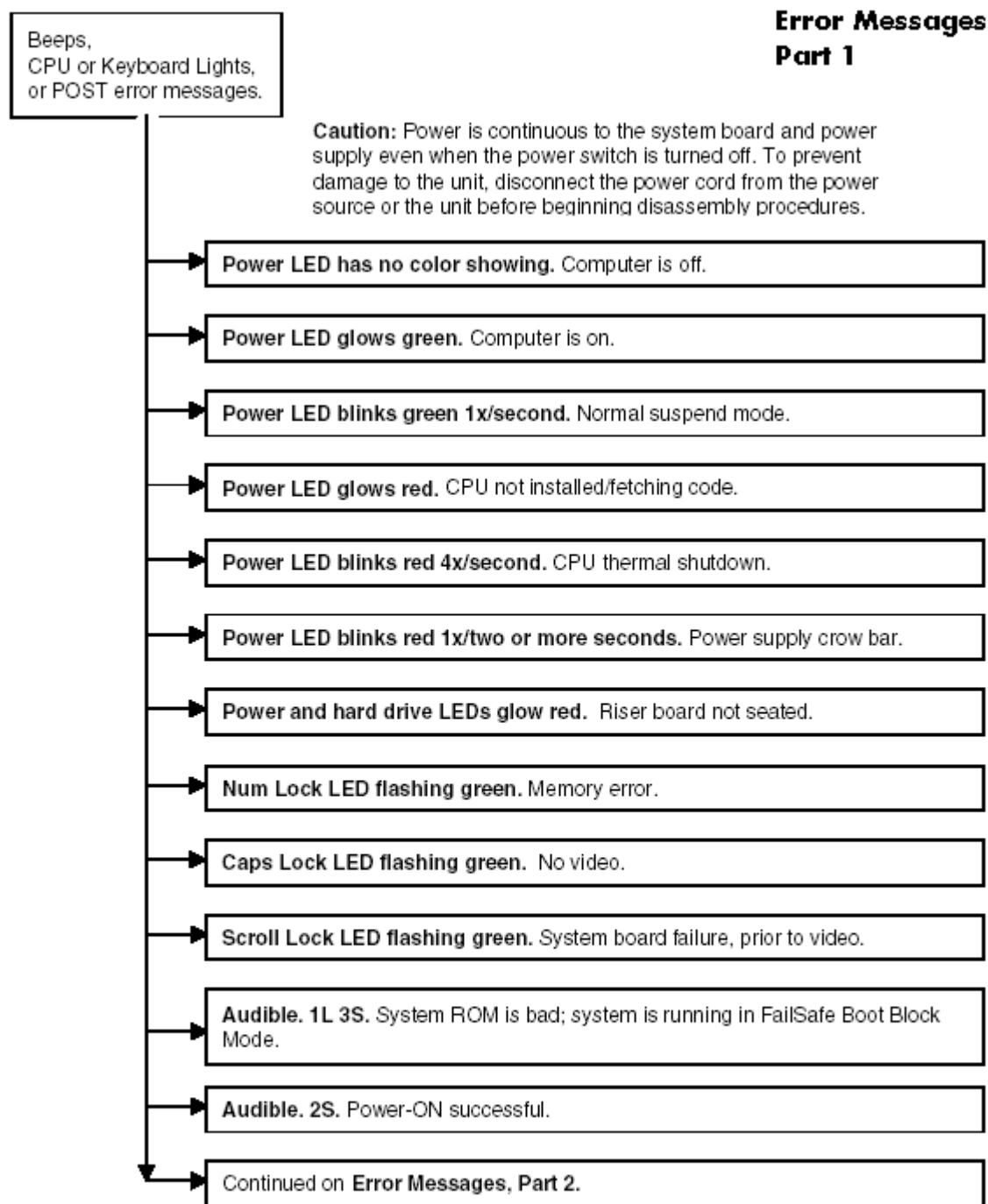


H.3.3 No Video, Part 3



H.4 Error Messages

H.4.1 Error Messages, Part 1



Notes: Short (S) and long (L) beeps will only be heard if the system has a speaker.
LEDs will only function on PS/2 keyboards, not USB.

Error Messages Part 2

Continued from
Error Messages, Part 1

Caution: Power is continuous to the system board and power supply even when the power switch is turned off. To prevent damage to the unit, disconnect the power cord from the power source or the unit before beginning disassembly procedures.

1S 2L. Num Lock blinking. System memory not present or incompatible. Unplug, open computer, and check memory modules. Ensure memory modules are correct type and that they match in size and speed.

1L 2S. Cap Lock blinking. Video controller not present or incorrectly initialized. Ensure monitor is plugged in. Unplug, open computer, and check video card. Reseat card and ensure it is in the proper expansion slot.

1L 3S. All keyboard LEDs blinking. ROM Failure. Create ROM diskette and reload ROM. Download ROMPaq from HP website at www.hp.com.

2L 1S. Scroll Lock blinking. System HW failure prior to video. Unplug, open computer, and check for physical damage. Ensure all cables and cards are seated. Look for burn marks or smoke.

No beeps. HD and Power LED blinking. Riser not detected. Unplug, open computer, and check and reseat riser board.

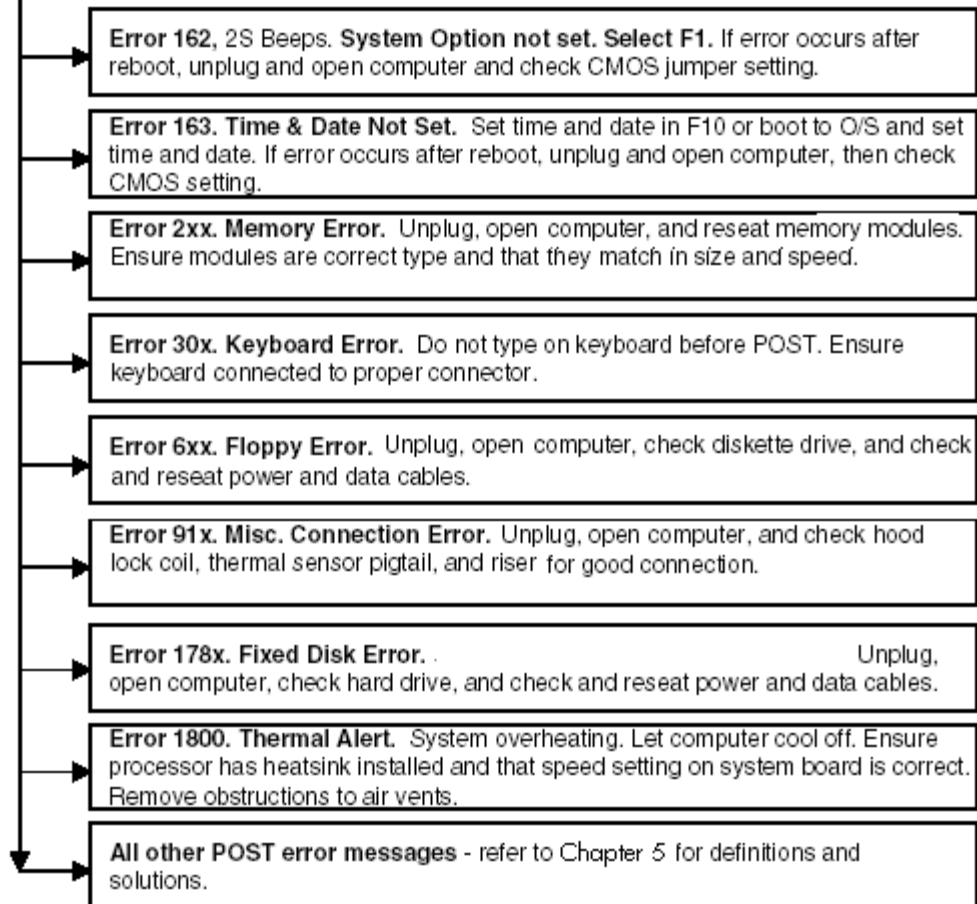
Continued on **Error Messages, Part 3.**

Notes: Short (S) and long (L) beeps will only be heard if the system has a speaker.
LEDs will only function on PS/2 keyboards, not USB.

Error Messages Part 3

Continued from
Error Messages, Part 2

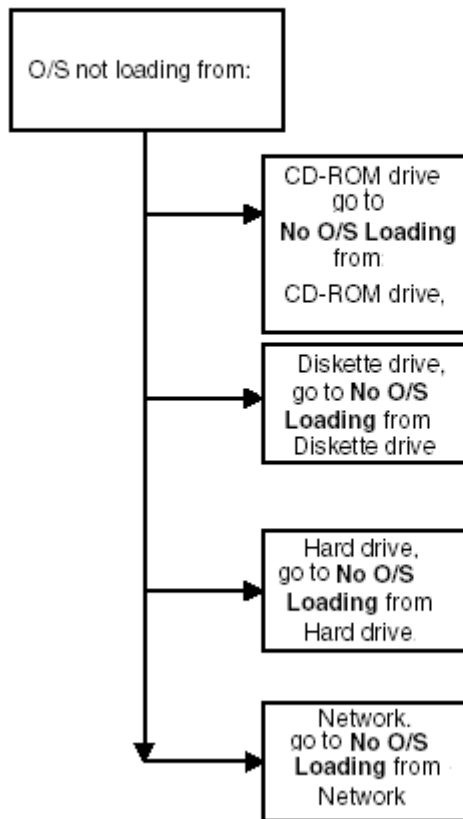
Caution: Power is continuous to the system board and power supply even when the power switch is turned off. To prevent damage to the unit, disconnect the power cord from the power source or the unit before beginning disassembly procedures.



Notes: Short (S) and long (L) beeps will only be heard if the system has a speaker.
LEDs will only function on PS/2 keyboards, not USB.
x = Numbers 1 - 9

H.5 No OS Loading

No OS Loading



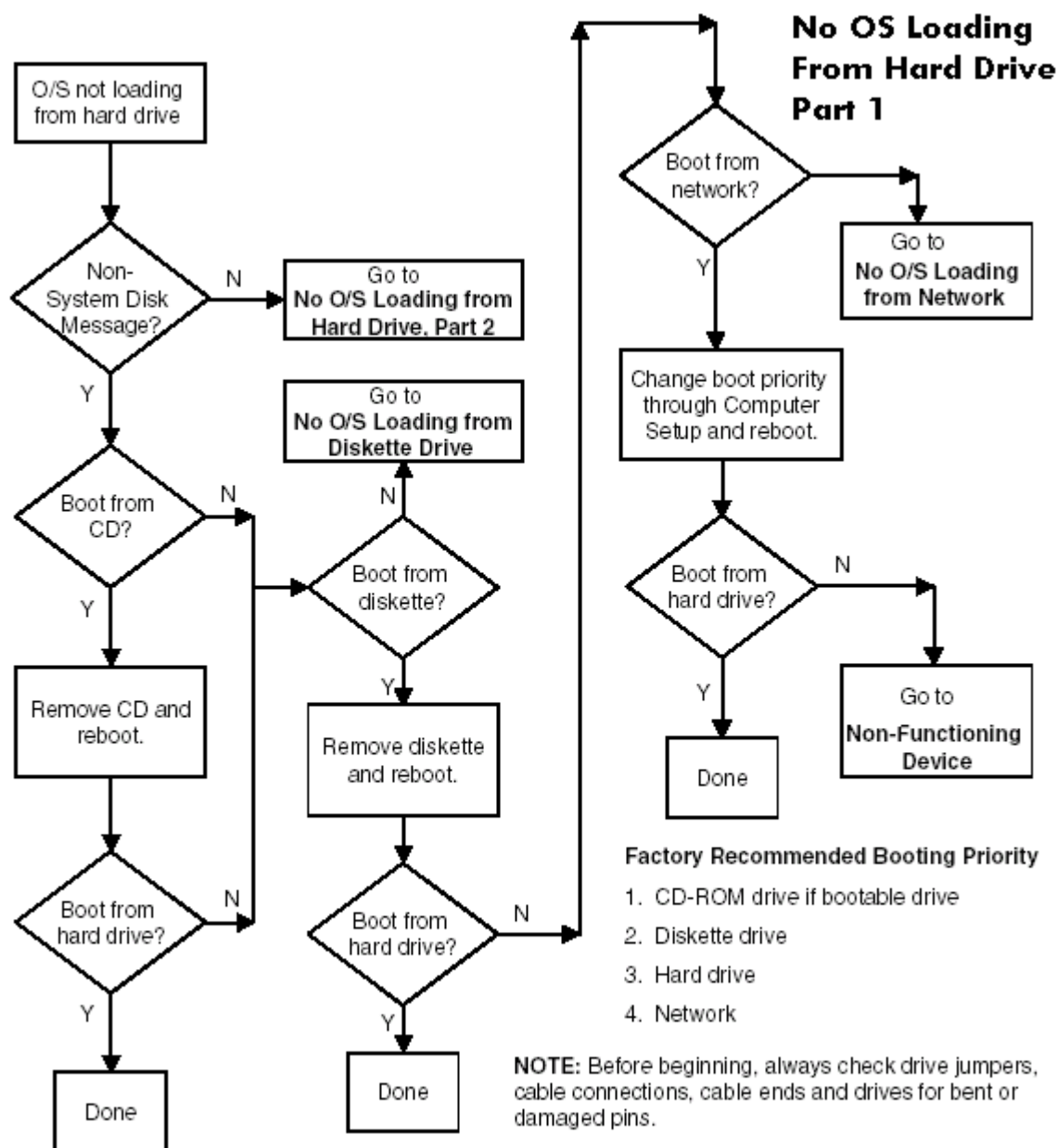
Factory recommended booting priority

1. CD-ROM drive
2. Diskette drive
3. Hard drive
4. Network

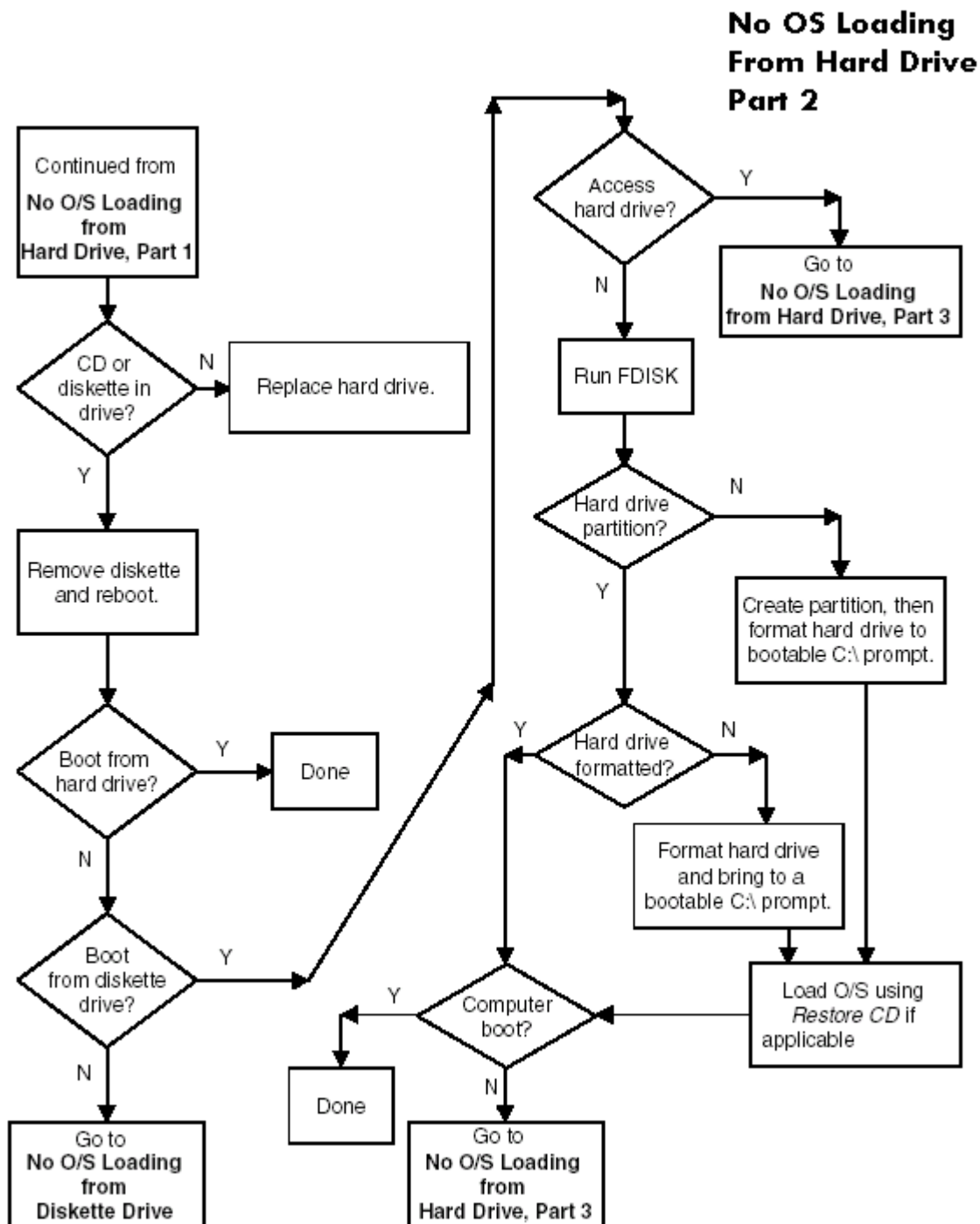
NOTE: Before beginning, always check drive jumpers, cable connections, cable ends, and drives for bent or damaged pins.

H.6 No OS Loading from Hard Drive

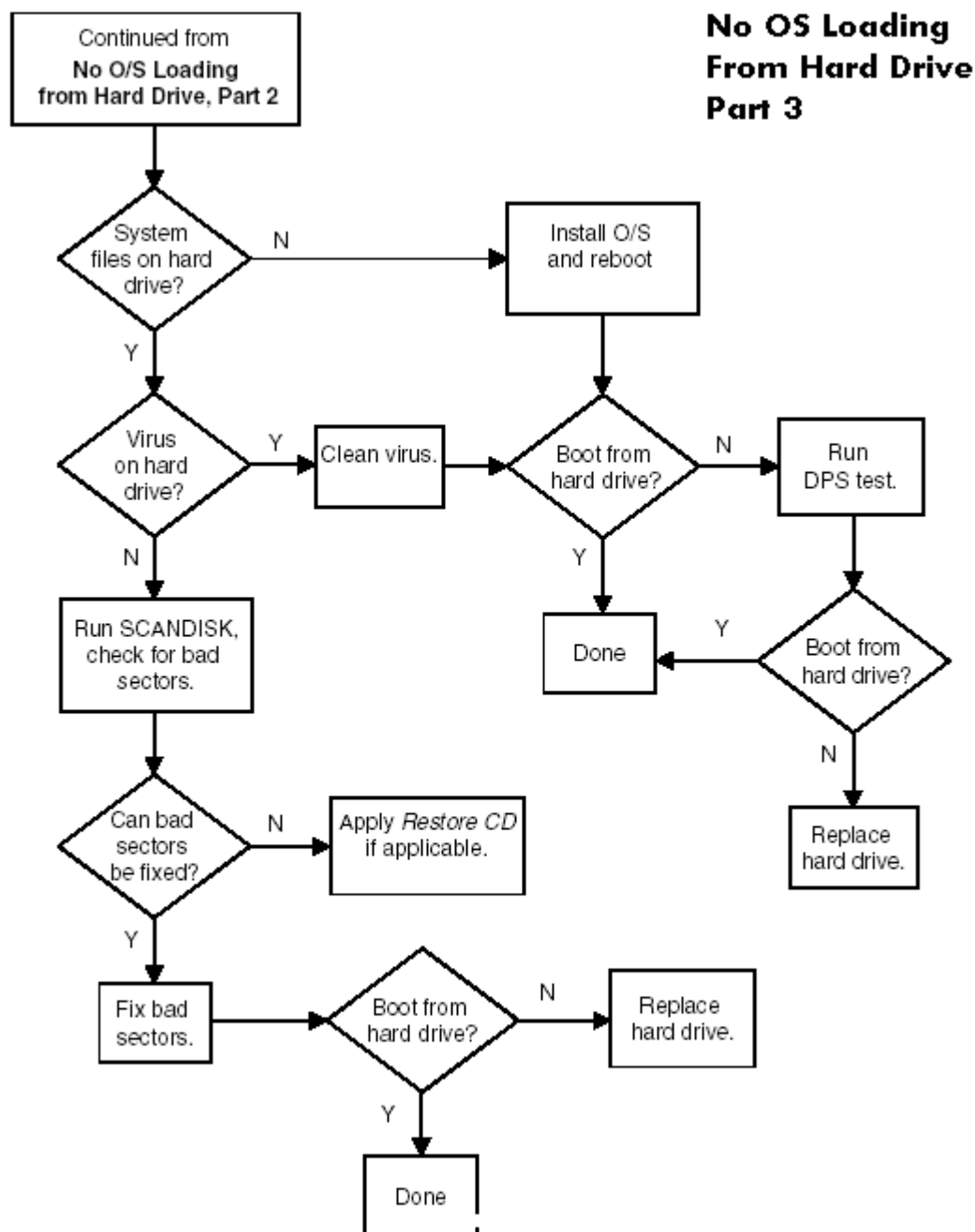
H.6.1 No OS Loading from Hard Drive, Part 1



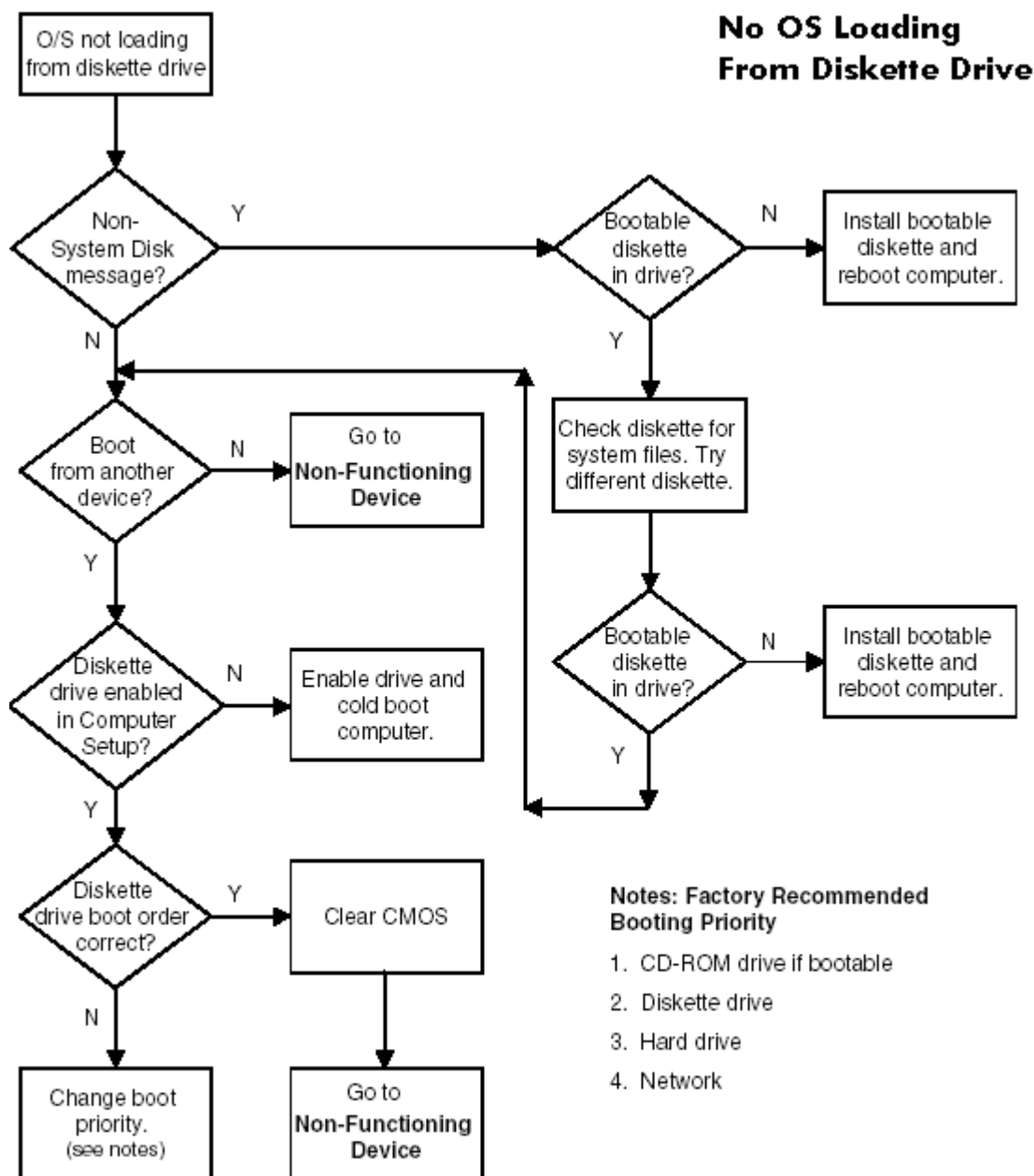
H.6.2 No OS Loading from Hard Drive, Part 2



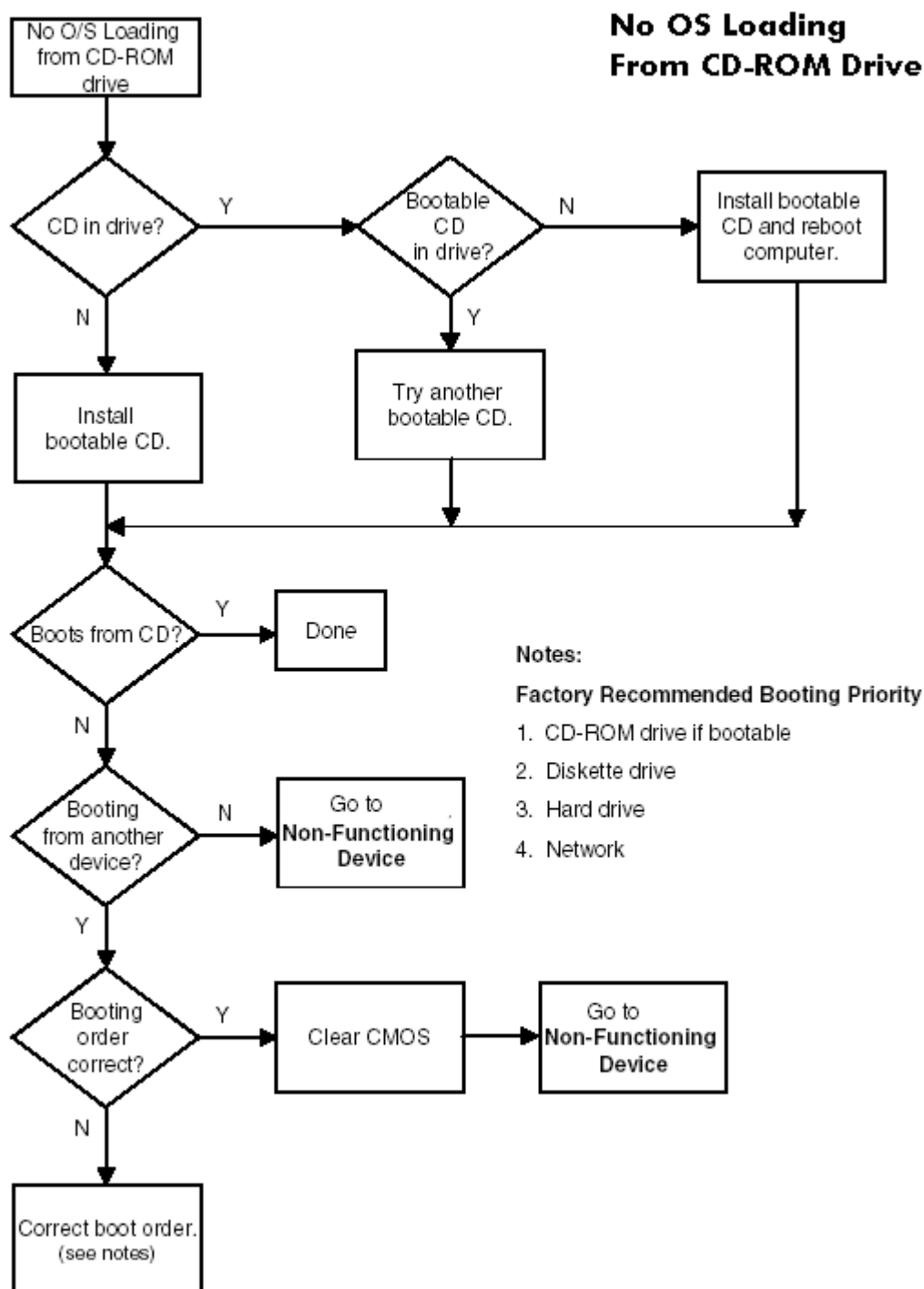
H.6.3 No OS Loading from Hard Drive, Part 3



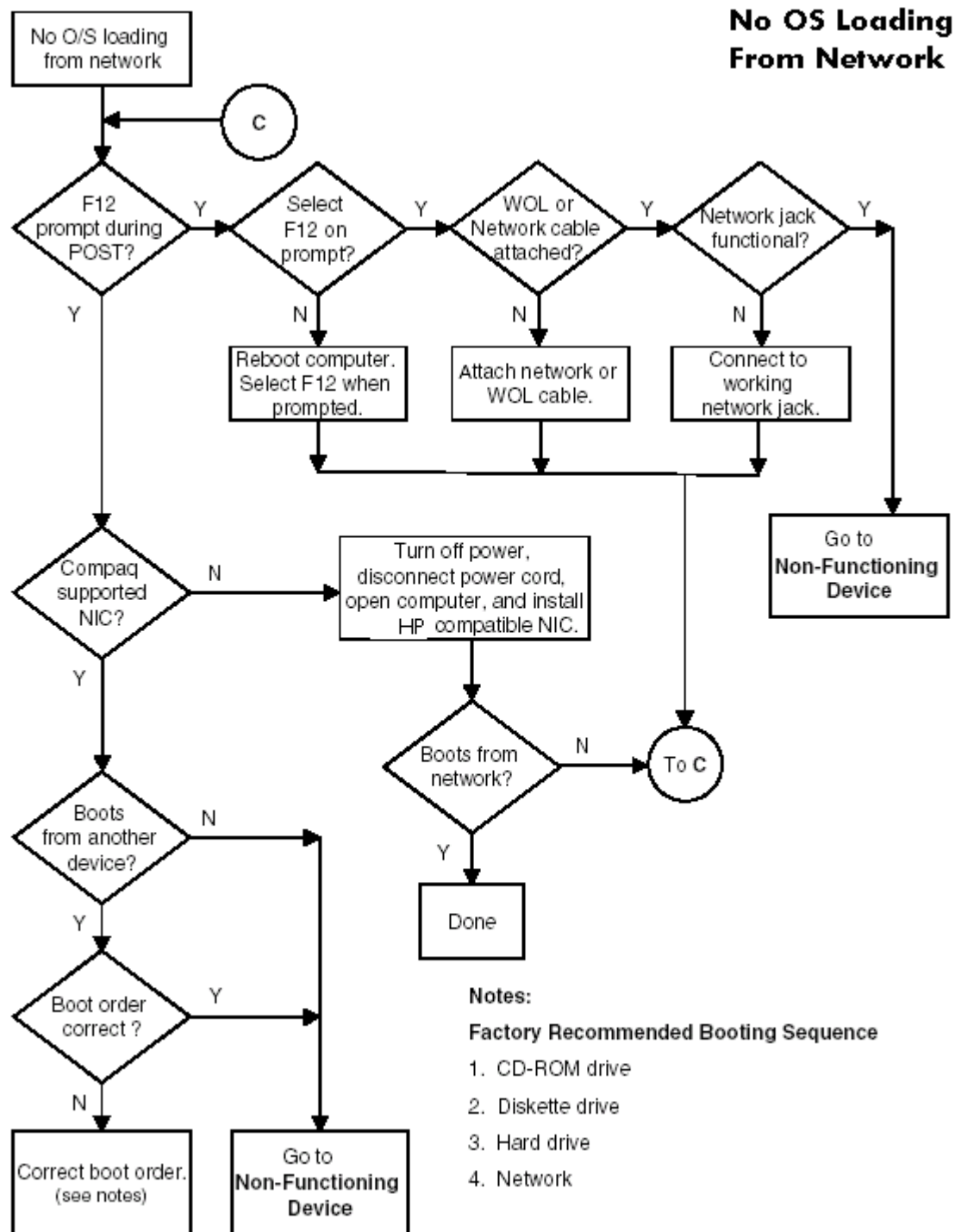
H.7 No OS Loading from Diskette Drive



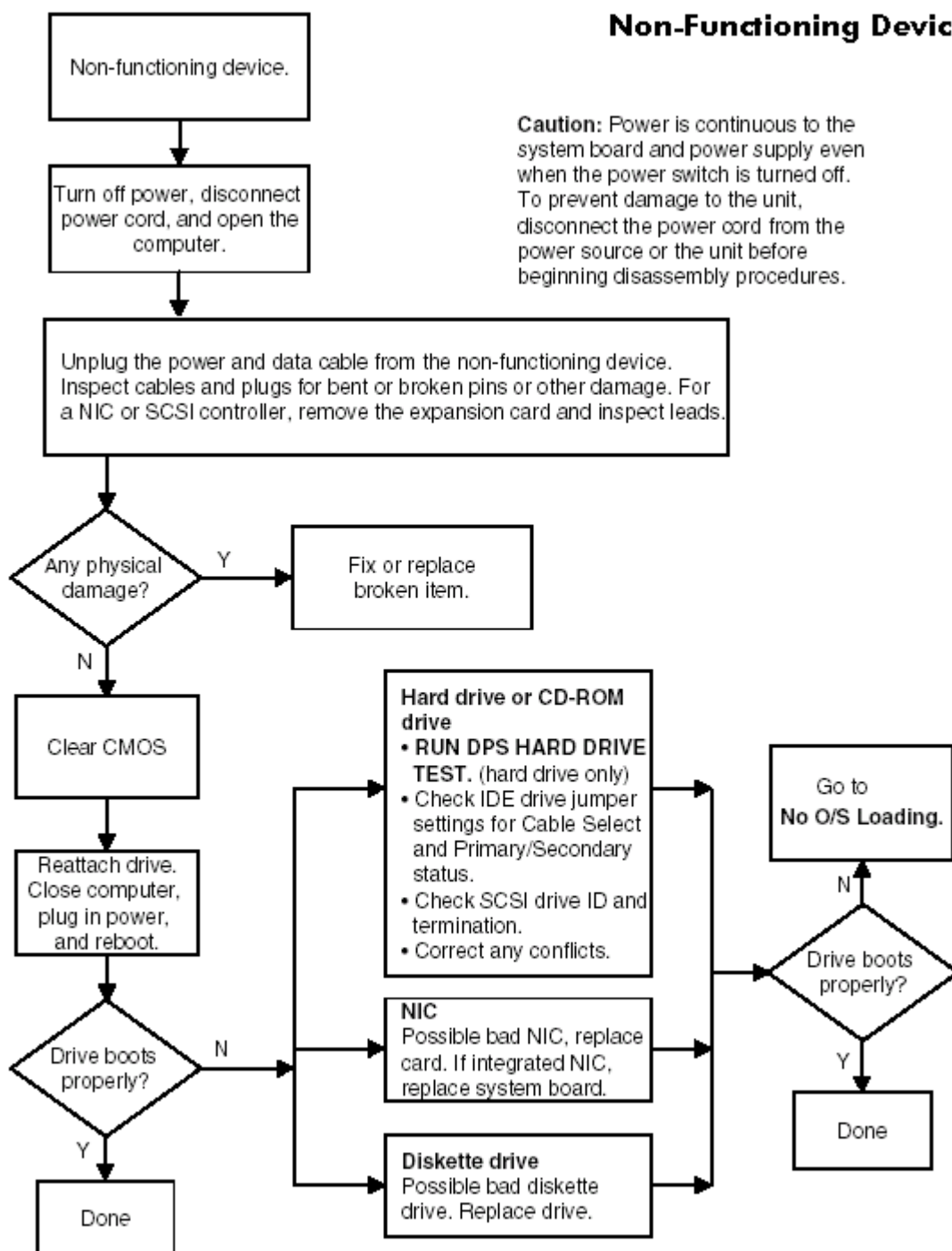
H.8 No OS Loading from CD-ROM Drive



H.9 No OS Loading from Network



H.10 Non-functioning Device



A

- access panel, installing and removing 60
- airflow 19
- asset tracking and security 42

B

- battery
 - disposal 53
 - handling 53
 - installing and removing 76
 - real-time clock 101
- bezel blanks, installing and removing 62
- BIST LED
 - location 16
- blank screen 107
- block diagram 56
- bootable disk, important information 47

C

- cable
 - proper handling 52
- cable lock
 - Kensington 46
 - provision 46
- cable lock slot
 - location 16
- cables
 - power 77
- cables and connectors 52
- cautions
 - adding devices 23
 - batteries 53
 - cover lock security 45
 - FailSafe Key 46
 - installation 23
- CD-ROM drive
 - See optical drive
- chain termination, SCSI 128
- changing password 43
- cleaning
 - keyboard 144
 - monitor 144
 - mouse 145
- clearing password 45
- cloning tools, software 37
- CMOS
 - button 148
 - clearing and resetting 148
- components
 - exploded view 14
 - front panel 15
 - rear panel 16

- computer pauses 101
- Computer Setup (F10)
 - Advanced functions 35
 - File functions 31
 - menu 31
 - overview 30
 - Security functions 33
 - Storage functions 32
 - using 31
 - utilities 31
- connectors
 - front panel 15, 16
- country-specific power cord set requirements 141
- cover lock security, caution 45
- cover lock, SMART 45
- customizing software 37

D

- deleting password 44
- deployment tools, software 37
- desktop management 37
- device
 - onboard 35
- device configuration 32
- diagnostic
 - light codes 99
- diagnostic tool for hard drives 47
- DIMMs, installing and removing 67
- disassembly order 57
- disk, cloning 37
- diskette drive
 - installing and removing 82
 - troubleshooting 104
- Documentation 10
- Documentation Library CD
 - contents 10
 - using 10
- drive
 - Drive Protection System (DPS) 47
 - protecting 47
- Drive Protection System 47
- DVD-ROM drive
 - See optical drive

E

- ECC Fault Prediction and Prefailure Warranty 48
- Energy Star 21
- entering
 - power-on password 43
 - setup password 43
- environmental specification 20
- ESD (electrostatic discharge)
 - materials and equipment 51

- preventing damage 50
- exploded view 14

F

- FailSafe
 - Key, caution 46
 - Key, ordering 46
- FailSafe key
 - obtaining 46
 - using 46
- fault notification and recovery 47
- finding additional information 10
- formatting disk, important information 47
- front bezel, installing and removing 61
- front fan, installing and removing 75
- front panel components 15
- front panel I/O device assembly, installing and removing 63
- front panel, troubleshooting 112

G

- graphics adapter
 - location 16
- grounding methods 51

H

- handling the workstation 52
- hard drive
 - activity light 15
 - diagnostic tool 47
 - installing and removing 83
 - proper handling 53
 - SCSI drives 128
 - troubleshooting 106
- hardware
 - removal and replacement 57
 - troubleshooting 113
- headphone
 - jack location 15
- heatsink, installing and removing 88
- hood cover
 - installation and removal 60
- hood solenoid lock
 - installing and removing 61
 - locking 45
 - unlocking 45
- HP Client Management Solutions 37
- Hyper-Threading Technology 22

I

- IDE connector pin assignments 137
- IEEE-1394
 - front panel location 15
- information

- system 31
- initial configuration 37
- installing
 - access panel 60
 - battery 76
 - bezel blanks 62
 - DIMMs 67
 - diskette drive 82
 - front bezel 61
 - front fan 75
 - front panel I/O device assembly 63
 - hard drive 83
 - heatsink 88
 - hood cover 60
 - hood solenoid lock 61
 - Kensington cable lock 58
 - memory 67
 - optical drive 78, 80
 - PCI card support 70
 - PCI Express 71
 - power button assembly 64
 - power supply 65
 - processor 90
 - security lock 58
 - speaker assembly 64
 - system board 92
 - system fan 66

J

- jumpers
 - resetting passwords 148

K

- Kensington cable lock 46
 - installation and removal 58
- keyboard
 - cleaning 144
 - connector pin assignments 132
 - delimiter characters 44
 - PS/2 connector location 16
 - troubleshooting 111

L

- LED
 - color definitions 94
- lifting the workstation 52
- line-in audio
 - connector location 16
- line-out audio
 - connector location 16

M

- Master Boot Record
 - security overview 46
- memory
 - guidelines 67
 - installing and removing 67
 - troubleshooting 116
- memory errors 48
- microphone
 - connector location 15, 16
- Microsoft Windows XP Professional
 - operating system 24

- monitor
 - blank screen 107
 - blurry video 107
 - cleaning 144
 - connector pin assignments 135
 - dim characters 107
- mother board 92
- mouse
 - cleaning 145
 - connector pin assignments 132
 - PS/2 connector location 16

N

- network connector location 16
- non-correctable memory errors 48

O

- operating system
 - Microsoft Windows XP Professional 24
- optical drive
 - activity light location 15
 - bays 15
 - eject button 15
 - installing and removing 78, 80
 - location 15
- ordering FailSafe Key 46

P

- padlock
 - location 16
- partitioning disk, important information 47
- password
 - additional information 147
 - changing 43
 - clearing 45
 - deleting 44
 - power-on 33, 43, 120
 - resetting jumpers 148
 - security 42
 - setup 33, 42, 43
- PCI card support, installing and removing 70
- PCI Express
 - compatibility matrix 71
 - overview 71
- PCI Express, installing and removing 71
- PCI slots
 - identification 69
- POST error messages 120
- power
 - BIST LED 16
 - button 15
 - consumption and cooling 19
 - dual-state button 41
 - light 15
 - resetting power supply 19
- power button, installing and removing 64
- power cord set requirements
 - country specific 141

- general 141
- power supply
 - cables 77
 - installing and removing 65
 - routing cables 77
 - surge tolerance 48
 - surge-tolerant 48
- power-on password 120
 - entering 43
 - establishing 43
 - purpose 42
 - setting 43
- pre-disassembly procedures 54
- prefailure memory warranty 48
- preinstalled software image 37
- problems
 - audio 109
 - CD-ROM and DVD 118
 - diskette 104
 - display 107
 - front panel 112
 - hard drive 106
 - installing hardware 113
 - keyboard 111
 - memory 116
 - network 114
 - optical drives 118
 - power supply 103
 - printer 110
- processor, installing and removing 90
- product
 - overview 13
 - specifications 17
- protecting
 - hard drive 47

R

- rear panel components 16
- recovery, software 37
- remote setup 37
- Remote System Installation 37
- removable media boot 32
- removal and replacement 57
- removing
 - access panel 60
 - battery 76
 - bezel blanks 62
 - DIMMs 67
 - diskette drive 82
 - front bezel 61
 - front fan 75
 - front panel I/O device assembly 63
 - hard drive 83
 - heatsink 88
 - hood cover 60
 - hood solenoid lock 61
 - Kensington cable lock 58
 - memory 67
 - optical drive 78, 80
 - PCI card support 70
 - PCI Express 71
 - power button assembly 64
 - power supply 65
 - processor 90

- security lock 58
- speaker 64
- system board 92
- system fan 66
- universal clamp lock 59

S

- safety precautions, cleaning 144
- SATA
 - RAID 126
- SATA drives
 - guidelines 126
- screws 52
- SCSI drives 128
 - chain termination 128
 - guidelines 128
 - SMART 128
- SCSISelect utility 128
- security
 - features overview 42
 - features, table 42
 - master boot record 46
- security lock installation and removal 58
- serial connector location 16
- serial connector pin assignments 132
- setting
 - power-on password 43
 - setup password 42, 43
- setup
 - initial 37
- setup password
 - entering 43
 - establishing 42
 - purpose 42
 - setting 42
- side access panel sensor
 - overview 45
 - setting protection level 45
- SMART 128
- software
 - configuration and deployment 37
 - customizing 37
 - Drive Protection System 47
 - Fault Notification and Recovery 47
 - management and updating 37
 - managing 37
 - Master Boot Record Security 46
 - recovery 37
 - Remote Management Setup 37
 - Remote System Installation 37
 - SCSISelect utility 128
 - service requirements 51
 - updating 37
- speaker, installing and removing 64
- static electricity 50
 - generating 50
 - grounding methods 50, 51
 - preventing damage 50
- surge-tolerant power supply 48
- system
 - diagnostics and troubleshooting 93
 - management 29
 - overview 13

- setting time and date 31
- specifications 17
- system board
 - block diagram 56
 - installing and removing 92
- system fan, installing and removing 66

T

- thermal sensor 48
- tool requirements 51
- troubleshooting
 - audio problems 109
 - CD-ROM and DVD problems 118
 - diskette problems 104
 - front panel problems 112
 - hard drive problems 106
 - hardware installation problems 113
 - Internet access problems 119
 - keyboard problems 111
 - memory problems 116
 - minor problems 101
 - network problems 114
 - preliminary checklist 93
 - printer problems 110
 - processor problems 117
 - scenarios and solutions 101
 - video problems 107

U

- Ultra ATA Integrity Monitoring 48
- universal chassis clamp
 - location 16
- USB
 - connector pin assignments 132
 - front panel location 15
- USB ports
 - rear panel location 16

W

- Wake-on-LAN feature 114

